Social Presence in Asynchronous Text-Based Online Learning Communities:

A Longitudinal Case Study using Content Analysis

Adisorn Na Ubon

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The University of York

Department of Computer Science

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This thesis is dedicated to my mum and dad

Abstract

This research examines social presence in asynchronous text-based online learning communities (OLCs). Much literature claims that such learning communities are ideal places for meaningful learning to occur. Various technologies can be used to support activities in these contexts but asynchronous text-based communication is probably the most common because of its simplicity and ease of use. Social presence is a meta-theory used to describe various aspects of OLCs. It has gained much attention recently because of its positive impact on social interaction and learning in such contexts. However, little research in this area has been done so far and there are some research gaps that need to be addressed.

This research aims to gain a better understanding of online social presence. Particularly, it focuses on the development of social presence and its impacts on learning in OLCs. Longitudinal case study research is used, allowing social presence among online participants to be investigated over time. The research is composed of three empirical studies. The preliminary study aims to validate various assumptions about OLCs and to gain a better knowledge of them. In the first part of the main study, the development of online social presence is investigated using content analysis. Social presence in online discussions is examined according to the social presence template. The second part of the main study further investigates the impact of social presence on online learning. Data obtained from the quantitative content analysis are analysed using various statistical techniques. The template and methodological framework used to conduct these studies is described in detail to provide guidelines for future researchers into social presence in these contexts.

The longitudinal findings from this research support the notion that social presence is important for both the learning process and outcomes in OLCs, and it must be promoted among participants throughout online learning.

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Author's declaration

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CHAPTER 1

Introduction

This chapter provides an overall idea about the research. It describes the background and outlines the research areas. It also explains the motivation to conduct this research as well as the problem to be investigated. The strategies used to address the problem and expected contributions of the research are presented. Finally, an overview of the remaining chapters of the thesis is provided.

1.1 Background

In the early days, a traditional distance education based on correspondence courses was quite a lonely activity. Throughout the learning process, students mostly had to work on their own, with little contact with other students and teachers. Interaction between the student and the instructor usually took the form of self-assessment exercises that the student completed and sent to the teachers for feedback (McIsaac & Gunawardena, 1996). The influence of educational theories, such as constructivism, that place an emphasis on active knowledge construction and the role of peer collaboration in learning has made distance education more interactive (Mason, 1994). Based on this approach, students are expected to take a more active and constructive role, contributing from their own knowledge and experience (Kaye, 1993 in Mason, 1994).

Recently, an increased attention has been paid to the role of social interaction and social contexts of distance education. (Gunawardena & McIsaac, 2003, see also Issroff & Scanlon, 2002). The shift from an individual approach to the more social and cultural approach of cognitive development is largely based on social constructivism and related theories (e.g., situated learning) built on the premise that individual development is closely linked to the social setting in which knowledge is embedded (Gunawardena & McIsaac, 2003). The concept of a learning community is introduced as a supportive environment for such meaningful activities to happen. Engaging students in collaborative

learning communities allows students to support and learn from each other, resulting in a positive and unique experience (Palloff & Pratt, 1999).

Facilitated by modern technologies, the concept of a learning community, or a community of learners (Brown, 2001; Wegerif, 1998), is applied to online settings, known as "online learning communities" (OLCs). OLCs are virtual places consisting of teaching and learning activities in any particular domain. In OLCs, instructor(s) and learners are geographically separated using communication technologies to mediate their communication and social interaction. These interactions unite OLC members and allow them to develop emotional connections, social cohesion, and a sense of community[1]. A strong sense of community not only increases student persistence in online programmes, but also enhances information flow, learning support, group commitment, collaboration, and learning satisfaction (Dede, 1996; Wellman, 1999). On the other hand, lacking such a feeling can have a negative effect on learning. As noted by Wegerif (1998), "without a feeling of community people are on their own, likely to be anxious, defensive and unwilling to take the risks involved in learning" (p. 48).

One of the important factors related to active social interaction and a sense of community of OLC members is "social presence" (Rovai, 2002). Social presence[2] is "the degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships" (Short et al., 1976, p. 65). In other words, social presence is the ability of people to project themselves socially and emotionally as real in a mediated communication. According to Garrison and Anderson (2003), the formation of community requires a sense of social presence among participants. As they state, "it is inconceivable to think that one could create a community without some degree of social presence" (p. 49). Social presence is an important factor that enhances instructional effectiveness (Gunawardena & Zittle, 1997; Tu, 2002). Studies show that social presence helps increase dynamic interaction (Tu & McIsaac, 2002b), encourages learning satisfaction (Gunawardena & Zittle, 1997; Hackman & Walker, 1990), initiates in-depth

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1 McMillan and Chavis (1986) define a sense of community as "a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together" (p. 9).

2 For now, the definition put forward by Short et al. (1976) is used as a guideline to understand the general concept of social presence. Several other definitions will be discussed in Section 5.3.

discussion (Polhemus, Shih, & Swan, 2001), and promotes collaborative learning (Gunawardena, 1995). In contrast, the lack of social presence results in impersonal communication and reduces information sharing among online participants (Leh, 2001). Anderson (2004) also notes that "the absence of social presence leads to an inability to express disagreements, share viewpoints, explore differences, and accept support and confirmation from peers and teacher" (p. 274). In the worst case, the insufficiency of social presence in online communication can lead to more frustration in learning (Rifkind, 1992).

Based on the literature, social presence plays a significant part in the learning performance and process. The study of social presence has benefits for teaching and learning activities (e.g., instructional design and development), especially in online education in which class members communicate through decontextualised situations. However, most studies in this area are rather deficient when they come to providing the appropriate measurements, settings, and periods of study needed to investigate social presence effectively (Tu, 2002).

1.2 Research context

This research involves an investigation of social presence in OLCs and attempts to gain a deeper understanding of social presence from a longitudinal study. Before social presence is examined, OLCs are explained to provide a general background of the research context. In this research, OLCs are the contexts in which social presence plays an important part. The underlying concept is built on the literature and work from three major areas—learning theories, community, and communication technologies.

The first foundation of the concept of OLCs comes from learning theories largely based on developmental psychology, particularly constructivism and social constructivism. Broadly speaking, constructivism is based on the view that learning occurs when individuals actively process the information and construct their own knowledge based on their previous experiences (Piaget, 1963). According to the constructivist approach, socio-cognitive conflict derived from peer collaboration is a significant source of cognitive growth (Jones, 1995a). Social constructivism, in addition, focuses on the role of social interaction and social contexts in cognitive development (Vygotsky, 1978). It is built upon the premise that the development cannot be understood without referring to

the social contexts (Rogoff, 1990). Sharing some principles of social constructivism and having a significant influence on the concept of OLCs are collaborative and situated learning. Generally, these two theories put an emphasis on social interaction among individuals in the learning process. In particular, collaborative learning theory argues that collaboration among individuals provides more chance to create some forms of interaction that generate mechanisms positive to learning (Dillenbourg, 1999). Thus, a collaborative learning situation is expected to produce cognitive development superior to individual learning (Flynn, 1992). Situated learning, finally, is based upon the ideas that knowledge and skills are best acquired from social interaction and social practice in authentic contexts (Brown, Collins, & Duguid, 1989).

Because of these learning theories and their emphasis on social interaction, the concept of community, the second foundation, can be applied to help transform theories into practice. Community, physical or virtual, is a place where a group of people is connected to each other by common interests and social interactions (Preece, 2000). It becomes a constructive idea for learning as engaging in such activities can promote critical thinking and social competency among learners (Laurillard, 2002; Moore, 1993). It is evident that using community as a place for learning is an increasingly important area of research in distance education and learning with technology (Gunawardena & McIsaac, 2003).

The last foundation of OLCs is communication technologies. The emergence of a wide range of technologies available to support learning activities has created a redefinition of what is meant by distance education (Palloff & Pratt, 1999). It has helped create a new form of social interdependence, which is not confined only to geographical locations (Preece, 2000). Asynchronous text-based computer-mediated communication (ACMC), in particular, has been widely adopted as an instructional medium for many years (Garrison, 1997; Hara, Bonk, & Angeli, 2000; Hiltz, 1995). It has proved popular because it allows people to connect at any time any place and makes minimum demands in terms of telecommunications infrastructure, making it suitable for a wide range of students.

1.3 Motivation for research

1.3.1 The growth of distance education

Distance education has gained much more popularity over the last few decades (McIsaac & Gunawardena, 1996). It has been perceived as a potential solution for people who want to carry out formal learning in order to remain competitive in a changing environment, for those who want to enhance their career opportunities without having to interrupt their employment, or for those in remote areas (Moore & Kearsley, 1996). The development of recent information and communication technologies has allowed the teaching and learning processes over a distance to become even more accessible and interactive.

1.3.2 The importance of community to learning

The concept of community is not something new, as it has always existed. Recently, it has been regarded by many as a forum for dynamic knowledge construction and collaboration in academic institutions (Hiltz, 1998; Palloff & Pratt, 1999; Rovai, 2002; Sallis & Jones, 2002). According to Palloff and Pratt (1999), "the formation of a learning community through which knowledge is imparted and meaning is co-created sets the stage for successful learning outcomes" (p. 5). Previously, communities were associated with geographical locations, where friends, neighbours, colleagues, and family were gathered to live, work, and play. With the advent of technologies that support communication over a distance, communities can spread out to geographically distributed locations. The time independent nature of these new forms of community also provides more flexibility for people in the way that they can interact whenever they want.

1.3.3 The importance of social presence in learning community

Social presence or "immediacy"[3] (Mehrabian, 1969; Wiener & Mehrabian, 1968) is important and should be created all the way through the learning community development (Garrison & Anderson, 2003). It is regarded as a significant component that

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[3] Immediacy is a measure of the psychological distance, which a communicator puts between himself and the object of his communication (Wiener & Mehrabian, 1968).

supports the constructive learning process and outcomes (Gunawardena, 1995; Gunawardena & Zittle, 1997; Hackman & Walker, 1990; Polhemus et al., 2001; Tu & McIsaac, 2002b). Learning communities where social presence is fertile establish a climate that encourages scepticism, questioning, and seeking for more understanding (Garrison & Anderson, 2003). The concept of social presence has gained much attention and interest in recent years for its impact on online learning (Rourke & Anderson, 2002a). Yet, much more research needs to be conducted in this area (Richardson & Swan, 2003).

1.3.4 The pervasiveness of asynchronous text-based computer-mediated communication (ACMC)

There are two reasons why this research focuses on the use of ACMC as the major learning support technology. First, the asynchronicity provided by ACMC allows students control over their learning process (McIsaac & Gunawardena, 1996). Although synchronous technologies, such as videoconferencing, are excellent for developing social relations among students as their real-time nature allows for spontaneous feedbacks, asynchronous applications, such as computer conferencing, offer students opportunities to communicate at times convenient to them (McIsaac & Gunawardena, 1996). It also supports students' ability to interact by providing time for reflection (Harasim, Hiltz, Teles, & Turoff, 2001; Mason, 1994). Second, ACMC requires low-bandwidth connection, which already exists through conventional telephone lines in most places. This provides students with more access by making courses available at various locations.

1.4 Scope

The term online learning communities (OLCs) used in this research refers to the formally structured communities of scholars in which students and tutors play the major roles. The research focuses on postgraduate distance learning programmes in which social presence through communication media can be observed. The reason for selecting this type of programme is based on two major grounds. First, online students, especially at postgraduate level, are usually adults (Gunawardena & McIsaac, 2003) who are mostly mature, self-motivated and have work experience in a particular field (Knowles, Holton, & Swanson, 1998). These characteristics of adult learners can generate a dynamic social

interaction (Sherry, 1996), thus providing a chance to observe social presence. Second, social interaction in these programmes, usually taking place over distance, may provide an opportunity to explore some factors (i.e., space, time, culture, and language) that potentially affect social interaction and collaboration among online participants.

Although a wide range of communication media are available to support learning activities in OLCs, this research concentrates on the use of ACMC, particularly computer conferencing, as the major means for online communication in the selected programme. The conferencing messages posted by online participants in the class discussions are the primary source of data of this research.

1.5 Research gaps

Although social presence is a vital factor for online learning, the infancy of the field and some research gaps certainly lead to the lack of a thorough understanding of social presence in this setting. According to Tu (2002), several weaknesses exist in the previous studies of social presence. In this research, three major weaknesses are described.

1.5.1 Short-term study design

One of the major weaknesses is that most studies of social presence are too short to allow for in-depth observation of social relations and social presence. Community and relationship building is a time consuming process as people need time to develop relationships and trust before discussing problems and sharing ideas (McDermott, 2000). Compared to face-to-face situations, when communicating in asynchronous text-based environments, it normally takes longer for online members to develop active interaction and strong interpersonal relationships (Gunawardena, 1995; Walther, 1992). However, most research studies on social presence are conducted using data collected in a short period of time, which is insufficient to observe changes and the development of social presence in an online setting (Tu, 2002).

1.5.2 Limited measurement tools

Many studies adopt the four social presence measurements from Short et al. (1976) to evaluate the degree of social presence (e.g., Burke & Chidambaram, 1999; Gunawardena, 1995; Gunawardena & Zittle, 1997). However, these four items—

personal-impersonal, sensitive-insensitive, warm-cold and sociable-unsociable—are too general to measure the degree of social presence (Tu, 2002) and they are not designed to investigate social presence in online learning contexts. This research applies the social presence template originally developed by Rourke, Anderson, Garrison, and Archer (2001a) to assess social presence from conferencing messages among online participants as the measurement tool.

Designed to guide the use of computer conferencing to support critical thinking in higher education, Garrison, Anderson, and Archer (2000) originally created a model of online learning called "community of inquiry"[4] that highlights the importance of learning happening through the interaction of three central components: cognitive presence, teaching presence, and social presence. Rourke et al. (2001a), followed by Swan (2002), further explicated the social presence elements of this model and developed the detailed coding template to assess social presence in online classes. The template is expected to provide a diagnostic capacity to critically measure the level of online social presence. It is also hoped that it will become a practical tool for the analysis of social presence from conferencing messages, as it covers various aspects of social communication and interaction in online environments. However, there are still some limitations in the coding template. Rourke et al. (2001a) applied the template to examine only two short courses, which is insufficient to test its validity in authentic online learning situations. The amount of collected data is rather limited, and therefore inadequate to measure the development of social presence in this type of learning community. Lastly, some indicators are not suitable for measuring social presence and can be excluded. As a part of this research, the template that they developed is refined. It is used subsequently as the major tool to capture social presence elements among participants in online learning.

1.5.3 Inadequate study in OLC contexts

Apart from the limitation of the measurement tools, another weakness is that very little research on social presence has been conducted in online learning contexts

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[4] Garrison et al. (2000) developed a community of inquiry model to provide a conceptual framework and a tool for the use of computer conferencing in supporting an educational experience. According to Garrison et al. (2000), learning occurs within the community through the interaction of three core elements—social presence, teaching presence, and cognitive presence.

(Gunawardena & Zittle, 1997; Richardson & Swan, 2003). In fact, studies on social presence in online learning have recently been performed by many researchers, but the results are still insufficient to provide strong evidence for instructional implications (Swan et al., 2000; Tu, 2002). Moreover, previous studies in this area have usually been conducted in non-educational settings (e.g., De Greef & IJsselsteijn, 2000), making it difficult to apply the results to learning environments (Tu, 2002). Previous studies carried out in educational settings are generally based on a traditional classroom (e.g., Christensen & Menzel, 1998), rather than an online environment, while many of them are also conducted by an experiment (e.g., Sallnäs, Rassmus-Gröhn, & Sjöström, 2000) that does not seem to represent actual OLC contexts in which many factors play significant roles. Therefore, further research in this area is important (Richardson & Swan, 2003).

1.6 Research problem

As mentioned earlier, OLCs are important for learning as dynamic social interaction among students makes a positive contribution to the learning process and outcomes. However, while collaborative OLCs are necessary, the formation of such communities is not an easy task due to the characteristics of online environments (Curtis & Lawson, 2001) and communication media (Daft & Lengel, 1986). Social isolation and the absence of face-to-face interaction with other members in an online space can lead to a negative learning experience (Hughes & Hewson, 1998). Working in this context also creates pressures in the way people work as they have to cope with not only space, but also time, culture, and language differences (Kimble, Li, & Barlow, 2000; Wenger, McDermott, & Snyder, 2002). This situation can be aggravated by communication over distance, which is sometimes limited by the nature of the media (e.g., text-based).

To overcome such constraints and promote collaborative learning in OLCs, it has been argued that a sense of social presence among online participants must be supported. Yet, the infancy of the field itself and some research gaps certainly lead to the lack of a thorough understanding of social presence in online learning environments. Further explanation concerning its usage, development, and effects on online learning is needed (Richardson & Swan, 2003; Rourke & Anderson, 2002a) in order to understand and provide an appropriate support for the creation of such a social element. This leads to the following central question of the research:

How does social presence develop in asynchronous text-based OLCs and what are its effects on learning in such environments?

Answering this question is important to the study of online social presence as it will provide an increased knowledge of this element and its functions in OLCs. The knowledge obtained from the research will provide useful implications for the improvement of teaching and learning, as well as the development of collaborative learning communities in such contexts. To address this question, a longitudinal study in educational settings and a mix of research strategies are required. Section 1.7 describes the objectives of this research in detail while Section 1.8 provides information about the research strategy employed to address the question.

1.7 Research objectives

The research uses an empirical approach to study the sense of social presence among participants in an online learning context. It concentrates on the analysis of conferencing messages to understand social presence. In particular, it aims to:

- Explore the development of social presence and its effects on learning in an online setting using a longitudinal approach;
- Develop a tool that can appropriately measure social presence in an online setting;
- Present a methodological framework on how to study social presence in an online learning context.

1.8 Research strategy

To address the central research question and achieve these research objectives, this research is divided into four major phases—the introductory phase, the preliminary study phase, the main study phase, and the concluding phase (Figure 1).

The introductory phase described in this chapter provides the overall structure of the thesis. The preliminary study phase (Chapters 2 to 4) is designed to develop a theoretical framework and acquire a better understanding of the research context. It sets the stage by providing an extensive review of the literature related to OLCs, followed by a preliminary study to validate the initial research assumptions found in the literature and

obtain first-hand experience about the contexts. This phase highlights the importance of social interaction and socioemotional aspects of communication in online learning environments and leads to more focusing on social presence in the next phase.

The main study phase starts with the analysis of the literature on social presence with the aim to gain in-depth knowledge of the field (Chapter 5). The central research question (see Section 1.6) is addressed at this phase. Two specific research questions—how does social presence develop in OLCs and what are its effects on learning—developed from the central research question are dealt with in two separate chapters (Chapter 7 and 8). In this phase, a longitudinal study using "content analysis"[5] is conducted as a research method to examine social presence from online conferencing messages. The messages from two one-year cohorts are analysed and compared. Methodological procedures, as well as a tool to carry out this phase, are also described in detail (Chapter 6).

Finally, the concluding phase provides the overall summary of the research (Chapter 9). It also presents the research contributions, evaluation, strengths and limitations, as well as future research directions.

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[5] Content analysis is a research method that utilises "a set of procedures to make valid inferences from text" (Weber, 1990, p. 9). Instead of observing people's behaviours, researchers acquire people's communications in textual formats and ask questions about these records, which serve as the basis of inference (Frankfort-Nachmias & Nachmias, 1996). The information about content analysis is discussed in detail in Section 7.2.1.

CHAPTER 1 INTRODUCTION

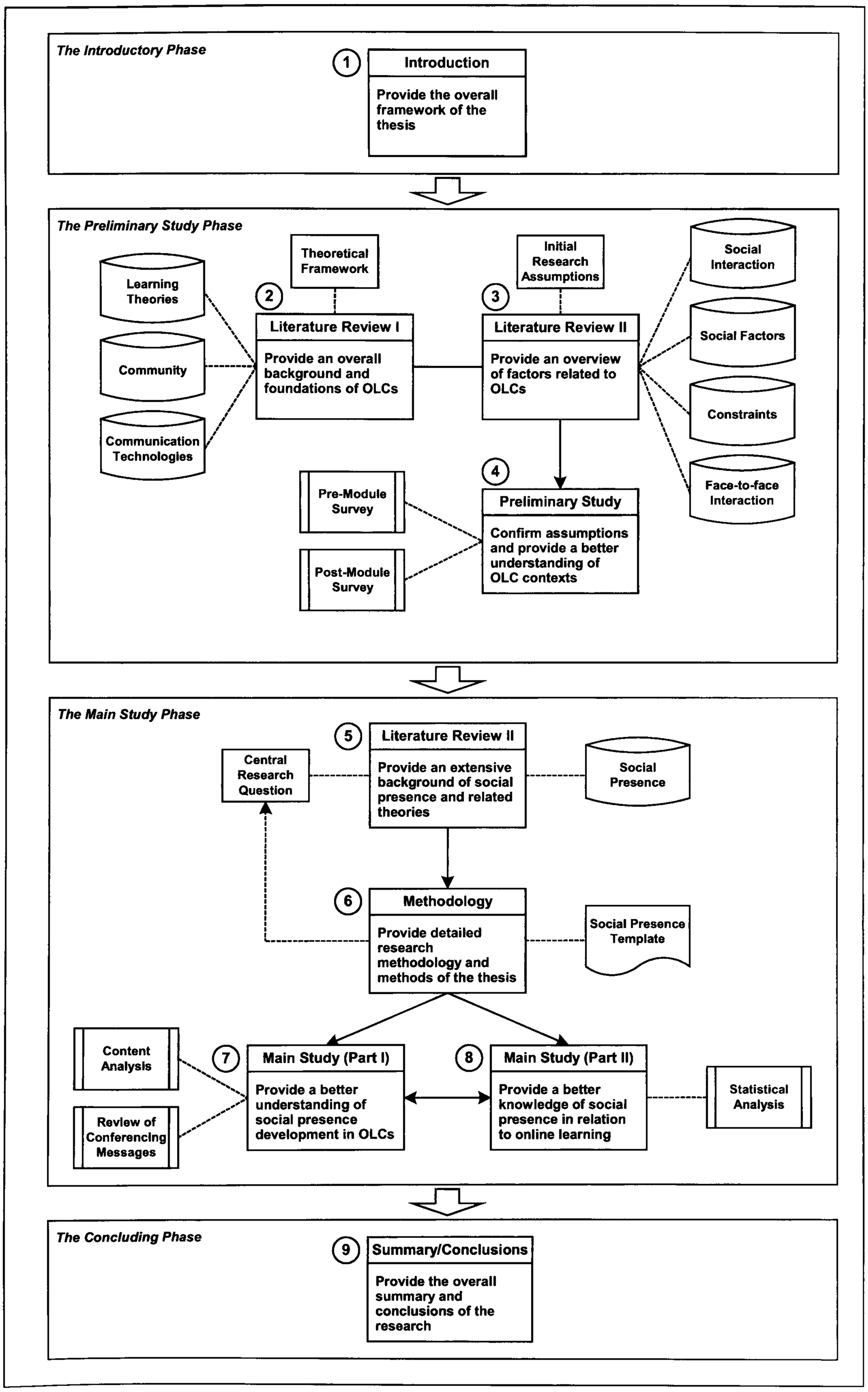

Figure 1 Research strategy

1.9 Expected contributions

As mentioned earlier (see Sections 1.5 and 1.6), research on social presence in online settings is still in its infancy and requires more explanation on how it develops and how it influences the learning process and outcomes. The weaknesses and research gaps in the previous studies on social presence also impair the development of the research field. In particular, most studies conducted with short data collection processes allow the researchers to observe only a part of the whole scenario. The lack of appropriate tools to measure social presence makes it more difficult to capture social presence, which is usually an abstract concept and is difficult to quantify. Lastly, many social presence studies are not conducted in an appropriate setting, making them less applicable to learning or having fewer implications for OLCs. Based on the research objectives (see Section 1.7), this research is expected to provide the following three major contributions.

1.9.1 Findings from a longitudinal study

First, it is expected to fill the missing gaps in social presence studies and provide more thorough knowledge about social presence in online learning environments. Using a longitudinal approach, the development of social presence in OLCs can be observed over time. From the main study, this research is also expected to provide a better understanding of how social presence relates to other factors associated with learning. The findings from a longitudinal study can help provide some important guidelines and implications for instructional design, as well as advanced research in this area.

1.9.2 Modified social presence measurement tool

The research adopts a measurement tool from Rourke et al. (2001a) and Swan (2002), and refines it in order to investigate social presence elements in OLCs more properly. By applying the tool to various online educational settings, it is also hoped to make the tool more valid and applicable. As part of the research contributions, the template is reviewed and modified. To assess the improvements in the new coding template, the major criteria are: 1) the ability of the template to capture various aspects of social presence in online discussions; and 2) the validity and replicability of the template when it is applied to different online learning contexts with a large amount of data.

1.9.3 Methodological framework

This research is also expected to deliver a practical methodological framework for social presence research allowing other researchers to conduct research in this field more efficiently. The framework can provide appropriate guidelines for implementing social presence research in online learning contexts. It can also help limit the impact of some concerns, such as data protection for future research work.

1.10 Thesis overview

1.10.1 Chapter 1: Introduction

The first chapter provides an overview of the thesis. This introductory chapter traces the evolution of certain ideas and the background of the research. It also explains the rationale for selecting the research field, research objectives, research gaps, the research problem, as well as the expected contribution of the research.

1.10.2 Chapter 2: Online learning communities (OLCs)

Chapter 2 is a review of the literature that forms the concept of OLCs based on three areas: learning theories, community, and communication technologies. The chapter starts with the central ideas of the learning theories that have a major influence on OLCs. The chapter then introduces the general concept of community that is subsequently applied to educational contexts. It describes the impacts of communication technologies that facilitate the development of communities in cyberspaces. ACMC as a principal learning technology and its use to support online communication in such environments is also described in detail.

1.10.3 Chapter 3: Social interaction and factors in OLCs

This chapter discusses the four major issues—social interaction, social factors, potential constraints, and face-to-face interaction—that affect collaborative learning in OLCs. The chapter starts with two major types of social interaction found in the literature. Such factors as identity, trust, and personal relationships as important foundations of social interaction are presented. Some constraints, such as space, time, culture, and language, are also described to see how they can affect active social interaction in OLCs. Finally, face-to-face interaction, considered important in communication and learning in such contexts by many researchers, is explained.

1.10.4 Chapter 4: Preliminary study

Chapter 4 describes a preliminary study conducted with the first module students in the Health Economics for Health Care Professionals programme. The study is aimed to confirm understandings obtained from the literature and to gain first-hand experience about online learning contexts. At this stage, the initial research assumptions about OLCs derived from the literature in Chapters 2 and 3 are presented and tested using a survey method. Two surveys (pre- and post-modules) are conducted. Quantitative findings from the two surveys are compared to observe how the views change. Qualitative data from both surveys are also utilised to support the statistical findings.

1.10.5 Chapter 5: Social presence in OLCs

To answer the central research question posed earlier in this chapter, it is important to understand the concept of social presence, a key component of effective online communication and learning. This chapter starts with an extensive review of the literature concerning social presence. Related theories are examined to obtain an understanding of communication in asynchronous text-based environments. Social presence measurement and tools used in other research studies are also described.

1.10.6 Chapter 6: Research methodology

This chapter describes case study research and the chosen methods by which data are gathered and analysed in order to address two specific research questions originating from the central research question. Two parts of the main study designed to answer the questions are discussed. The research strategies used to carry out the research in each part are described. The modified social presence template as the major research tool is also presented in this chapter.

1.10.7 Chapter 7: Main study (Part I)

Chapter 7 is designed to address the first research question. Based on the research work at the Department of Health Economics, the conferencing messages over two years collected from two different cohorts are analysed according to the template to gain knowledge of social presence development in OLCs. At this stage, the conferencing messages from online discussions among participants, both students and tutors, are investigated using content analysis.

1.10.8 Chapter 8: Main study (Part II)

Chapter 8 is designed to address the second research question and is where the data obtained from content analysis are further analysed. Particularly, the social presence of online students is explored in more detail to see how it relates to other factors, such as gender, active participation, and learning outcomes. Different statistical techniques are applied to obtain the research findings.

1.10.9 Chapter 9: Summary and conclusions

This final chapter provides a summary and describes major contributions of the research. It discusses an evaluation of the findings, tool, and methods used in this research. Strengths and limitations of the research as well as overall conclusions are discussed. Finally, future research directions are put forward.

CHAPTER 2

Online learning communities (OLCs)

This chapter provides a review of the literature that underpins this research. In particular, it provides the general theoretical background of OLCs derived from three different areas, constructivism, community, and communication technologies. It first presents the overall concepts of OLCs, followed by in-depth explanations of each individual component.

2.1 Introduction

The notion of using community as an ideal place for learning builds on significant reform efforts and a changing philosophy of education that focuses on collaboration and social interaction among learners (Hiltz, 1998). Being a part of a community can stimulate positive learning experiences and encourage community members to engage in social interaction that promotes both intellectual and social competence (Harasim et al., 2001). The concept of communities in education or learning communities has emerged as a major development in education over the last decade (Brown et al., 1989; Graves, 1992; Rogoff, 1994; Westheimer & Kahne, 1993).

Learning communities evolved from the influence of theoretical foundations such as social constructivism and situated learning that focus on active social interaction and knowledge construction among learners in authentic contexts (Kilpatrick, Barrett, & Jones, 2003, see also Jones & Issroff, 2005). The term learning communities is defined and used in diverse and flexible ways (Kilpatrick et al., 2003). Essentially, learning communities are composed of groups of students and tutor(s) who have, or are motivated by, a common goal, and are engaged interactively in the pursuit of acquiring abilities and knowledge (Harasim et al., 2001). Tu and Corry (2002) defined such communities as "a common place where people learn through group activity to define problems affecting them, to decide upon a solution, and to act to achieve the solution. As they progress, they gain new knowledge and skills". Learning communities are considered to support critical discourses (Jonassen, 1995) and allow participants to integrate multiple learning perspectives (Jonassen, 1993). Over the last decade, the development of communication

technologies has had a profound impact on the concept of learning communities (Kilpatrick et al., 2003). Facilitated by information and communication technologies, learning communities can become temporally and geographically distributed (Palloff & Pratt, 1999).

Online learning communities (OLCs) combine learning communities and technologies to support the collaborative online learning process. However, the concept of OLCs has been defined differently in terms of scope and meaning. Bauman (1997) perceives the notion of OLCs in a broad fashion involving settings that are both within and beyond the classroom. Palloff and Pratt (1999), on the other hand, simply define OLCs in classroom settings as the means through which online leaning takes place. In this research, OLCs are limited to formal classroom settings where students and tutors are the key players. They are described as structured communities of learners and tutors in academic institutions, consisting of organised teaching and learning activities. In such learning environments, participants who are geographically separated use various communication technologies available to facilitate their social interaction and collaboration.

Palloff and Pratt (1999) note that OLCs are closely related to the new learning paradigm that involves a more active, collaborative approach. In this type of community, learners are offered a broad opportunity to reflect on their ideas and participate whenever they want (Harasim et al., 2001). "Although the instructor is responsible for facilitating the process, participants also have a responsibility to make community happen" (Palloff & Pratt, 1999, p. 32). The formation of OLCs is characterised by:

- Active interaction involving both course content and personal communication;
- Collaborative learning among online students evidenced by comments directed primarily student to student rather than student to instructor;
- Socially constructed meaning evidenced by agreement or questioning, with the intent to achieve agreement on issues of meaning;
- Sharing of resources among students;
- Expressions of support and encouragement exchanged between students, as well as willingness to critically evaluate the work of others (Palloff & Pratt, 1999, p. 32).

The key element of OLCs is social interaction among community members that promotes a meaningful learning process and outcomes. Two types of social interaction essential to learning in these environments are described in Chapter 3. In this chapter, the concept of OLCs needs to be explained further to provide a general background of the context. The concept derives from three major areas of the literature: learning theories, community, and communication technologies. These components are strongly linked to the concept of social interaction as much as to each other. Social learning theories (e.g., social constructivism) concentrate on social interaction as a major part of the cognitive development. Community, in addition, focuses on the context where active and meaningful social interaction takes place. Finally, communication technologies are considered important tools that support social interaction among online community members. The next sections describe these three components in more detail.

2.2 Learning theories

There are some learning theories that have an influence on the formation of OLCs. The four major theories to be described in this section are constructivism, social constructivism, collaborative learning, and situated learning.

2.2.1 Constructivism

Constructivism owes a great deal to the work of Jean Piaget who developed the theory based on his view of child developmental psychology (Scheurman, 1998). It has been a prevailing instructional paradigm for the past 20 years (Issroff & Scanlon, 2002). As opposed to behaviourist learning theory that centres on behaviours that can be observed and measured (Good & Brophy, 1990), the constructivist learning approach focuses on hidden mental processes occurring inside individuals' minds (Jones & Mercer, 1993). According to Jones and Mercer (1993), Piaget's approach has been called constructivism because of its emphasis on individuals' construction of their own meaning based on their previous experiences. They are actively constructing new knowledge and understanding through the interacting processes of assimilation, accommodation, and cognitive conflict that form the foundation for their cognitive growth (Jones, 1995a).

When experiencing new information, the mind attempts to make sense of it within cognitive or mental structures known as "schemata". The new information may be added to or combined with existing schemata (assimilation) or the schemata may be modified

or changed in order to fit such information (accommodation). In Piaget's constructivism, knowledge is acquired when existing schemata are challenged, thus provoking a state of cognitive conflict. This cognitive conflict leads to an intellectual "disequilibrium" and to a search for resolution (Doise & Mugny, 1984). The conflict resolution (through either an assimilation or accommodation process) re-establishes a state of cognitive stability (equilibrium) and initiates cognitive growth (Piaget, 1963).

For Piaget, peer interaction that generates solutions to problems based on different perspectives is important and is regarded as a highly effective means for cognitive development (Tudge & Rogoff, 1989; Wadsworth, 1996). Although Piaget was primarily concerned with individual development, he believed that social exchange between individuals is important for the development of individual mental structures (Tudge & Rogoff, 1989). In other words, the interchange of ideas with others creates a chance where an individual's thinking is different from that of others, and thus provokes a socio-cognitive conflict, which is a source of the developmental process. Jones (1995a) mentions that this socio-cognitive conflict has more influence on cognitive development than that occurring within the same individual. As she notes "it is argued… that discrepancies between children (socio-cognitive conflict) are more powerful than the impact of discrepant models within the same child" (p. 253).

Over the past decades, increased attention has been paid to the role of social interaction and social context as the foundation for developing new understandings for teaching and learning (Issroff & Scanlon, 2002; Jones, 1995a; Jones & Mercer, 1993). The change is largely based on an approach known as "social constructivism". This is considered a major influence on the concept of OLCs used in this research. The next section describes the theory in more detail.

2.2.2 Social constructivism

Social constructivism is a theoretical influence based mostly on the work of a Soviet psychologist, Lev Vygotsky, as well as other researchers from the socio-cultural perspective (Dillenbourg, Baker, Blaye, & O'Malley, 1996). Social constructivism is also known by various names including socio-cultural theory, neo-Vygotskian theory, cultural psychology, and communicative learning theory (Jones & Mercer, 1993). A central concern in this approach is the causal relationship between social interaction and

individual cognitive change (Dillenbourg et al., 1996). In other words, social interaction allows an individual to attain higher levels of competence as it provides the necessary tools (e.g., language) for learning and thinking (Vygotsky, 1962).

While Vygotsky acknowledged individual aspects of cognitive development, his focus was different from Piaget's approach (Tudge & Rogoff, 1989). Particularly, Vygotsky placed more emphasis on the role of social and cultural contexts in such development (Rogoff, 1990; Tudge & Rogoff, 1989). As noted by Jones (1995a), "Now the social context is seen as crucial, and language is also seen as crucial and interrelated with action (for children); providing them with an additional tool used both to reflect on and direct behaviour" (p. 255). She further notes "this move reflects a shift in the dominant theories in the field of cognitive development and learning, where individualist theories of development and learning have given way to more socially and culturally sensitive views of cognition" (p. 255).

Social constructivism was also founded on the premise that cognitive growth cannot be understood without reference to the social setting in which the individual is embedded (Rogoff, 1990). Vygotsky (1962) believed that thought and language are inextricable. For Vygotsky, language is essential for conceptual growth because it imparts a unique quality to human thought and provides a means to make sense of the world (Jones, 1995a; Jones & Mercer, 1993). In terms of learning, Vygotsky (1978) also proposed that each individual, in any domain, has an "actual developmental level" as well as an immediate potential for development within that particular domain. Vygotsky (1978) termed this difference between the two levels the "zone of proximal development" (ZPD), defined as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers" (p. 86). To put more simply, the ZPD represents an area of cognitive growth that an individual can successfully achieve with some cognitive support and guidance from an adult or a more competent peer (Jones, 1995a; Jones & Mercer, 1993).

Vygotsky (1962) postulated that those who are more capable could provide appropriate assistance with the subject matter to help less capable persons to complete a task that they cannot achieve in isolation. This guidance and support that helps the less

knowledgeable persons to step up to the higher level they can achieve is also known as "scaffolding" (Wood, Bruner, & Ross, 1976; Wood & Middleton, 1975). Scaffolding also refers to the gradual withdrawal of social and information support once they increase mastery of a given task, allowing them to take full control and responsibility (Díaz, Neal, & Amaya-Williams, 1990).

Two learning theories derived from social constructivism are collaborative learning (Dillenbourg, 1999; Dillenbourg et al., 1996) and situated learning (Brown et al., 1989; Lave, 1988; Lave & Wenger, 1991). Both learning theories concentrate on social interaction with other participants in the learning process. Understanding these two theories helps provide a clearer theoretical framework for how the concept of OLCs evolves. The next two sections (Sections 2.2.3 and 2.2.4) describe these learning models in detail.

2.2.3 Collaborative learning

Collaborative learning refers to an instructional theory that encourages students to work together on academic tasks in a way that promotes individual learning through processes of collaboration (McConnell, 2000). Sharing some principles of social constructivism, collaborative learning views knowledge as a social construct supported by active social interaction with peers (Hiltz, 1998). Collaborative learning has gained increased attention as a result of the shift from an individual approach towards a much more socially and culturally based approach (see Issroff & Scanlon, 2002; Jones & Issroff, 2005). However, the term collaborative learning is used excessively and abusively for more or less anything both within and across academic fields (Dillenbourg, 1999). Dillenbourg (1999) discusses in detail the problems associated with defining the term. Yet, he proposed a broad definition of collaborative learning as "a situation in which two or more people learn or attempt to learn something together" (p. 2). To clarify his broad definition, Dillenbourg (1999) further discusses three dimensions: the variety of scale, the meanings of learning, and the meanings of collaboration.

The terms collaborative and cooperative learning are sometimes used interchangeably, yet a distinction between these two terms can also be made (McConnell, 2000). The difference is usually described by the division of labour or task among group members (see Dillenbourg, 1999; Dillenbourg et al., 1996). In cooperative learning, the task is

divided hierarchically into independent subtasks, which are distributed to group members. The members solve those subtasks independently and bring together their results into the final output. Some researchers (e.g. Hooper, 1992 in Kaye, 1995) called this approach "task specialisation". In collaborative learning, on the other hand, group members work together on the same tasks. Having said that, some spontaneous division of task among group members may occur in collaborative learning (Dillenbourg et al., 1996). This is what Dillenbourg (1999) called the "horizontal division" of task (as opposed to the "vertical division") that divides the task into reasoning layers. By this, he meant that the working processes are highly interwoven as one subject monitoring the other. Such a division may take place in the way that a group member takes responsibility for the low levels parts of the task while the other focuses on strategic parts (Miyake, 1986 in Dillenbourg, 1999). According to Dillenbourg (1999), moreover, the horizontal division of tasks in collaborative learning is rather unstable because the roles may be shifted among members, as opposed to the vertical division in cooperative learning where the roles are fixed and usually made explicit at the start.

Dillenbourg (1999) also argues that collaborative learning is not a single mechanism. Generally, individuals perform some activities (e.g., reading, building, predicting) that trigger some learning mechanisms (e.g., induction, deduction, compilation). In collaborative learning processes, on the other hand, some forms of interaction among individuals are expected to occur and activate more activities (e.g., explanation, disagreement), thus generating more cognitive mechanisms (e.g., knowledge elicitation, internalisation). However, there is no guarantee that the expected interactions or those mechanisms will actually occur in any collaboration (Dillenbourg, 1999).

Successful collaborative learning results in both social competency and cognitive learning outcomes of students (McConnell, 2000; Slavin, 1990). Studies have shown that collaborative learning is superior to individualistic instruction in terms of personal achievement, positive changes in social attitudes, and enhancement of learning motivation (Flynn, 1992). Dede (1990 in Kaye, 1995) indicates that a collaborative learning approach can provide students with active construction of knowledge, a chance to develop oral explanation skills, an exposure to various perspectives, and a motivating feedback from others. Students tend to generate a higher-level of reasoning, a greater diversity of ideas and procedures, more critical thinking, and more creative responses

when they are learning in collaborative groups than when they are learning in isolation (Schlechter, 1990).

However, not all attempts to create a collaborative learning environment will succeed (Kaye, 1995). Individuals do not necessarily learn or work collaboratively when they are together. "In some cases, collaboration can lead to conformity, process loss, lack of initiative, conflict, misunderstandings, and compromise, and the potential benefits are not always realised" (Kaye, 1995, p. 197). Successful collaboration is based on a number of factors. As noted by Jones and Issroff (Jones & Issroff, 2005), "there is strong evidence that collaborative work both on and offline can be very motivating and rewarding for learners, but this depends on many factors being right" (p. 404). Apart from the attributes of group members (e.g., competence, motivation), some of the important factors include the structure (e.g., group size, group composition, learning activities, communication media[6]) where group processes occur, the management of these processes, and the role of tutors (Kaye, 1995, see also Jones & Issroff, 2005).

Collaborative learning has its implications for the formation of OLCs in which members gain a positive learning experience from active social interaction. With social interaction, students can share strengths and improve their weak skills. They can also develop new knowledge that emerges from active discussion and information sharing with tutors and other students in the collaborative learning processes (Hiltz, 1995; Palloff & Pratt, 2001). Having said that, collaborative learning also has a negative aspect, which can be harmful to effective learning in such contexts. Issroff and Del Soldato (1996 in Jones & Issroff, 2005) claim that a less capable student may have less input if (s)he work in groups in which a more capable student dominates the group collaboration. "This may be a particular problem if the less able student perceives his/her partner as more able and feels that there is no point in trying, or that it would be better for the more able student to complete the task on his/her own. On the other hand, less confident learners might prefer a partnership with more skilled colleagues, to increase their chances of success as a group" (Jones & Issroff, 2005, pp. 399-400).

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[6] For further discussion, see Dillenbourg and Schneider (1995). *Collaborative learning and the Internet*, ICCAI 95, Retrieved 01 April 2005 from http://tecfa.unige.ch/tecfa/research/CMC/colla/iccai95_1.html.

2.2.4 *Situated learning*

The theory of situated learning, also known as situated cognition, is based upon research of social constructivist theorists (Brown et al., 1989). The theory originally formulated by Lave (1988) is based on the concept that "knowledge is situated, being in part a product of the activity, context, and culture in which it is developed and used" (Brown et al., 1989, p. 32). Put more simply, situated learning views knowledge as inseparable from a particular context. If the learning process is isolated from the context, the obtained knowledge is often incomplete and meaningless.

Situated learning takes apprenticeship as a participative learning method and a means of acquiring knowledge. Apprenticeship is not something new. As noted by Collins, Brown, and Newman (1989), "before schools appeared, apprenticeship was the most common means of learning and was used to transmit the knowledge required for expert practice in fields from painting and sculpting to medicine and law" (p. 453). Working as apprentices in a domain (e.g., craft apprenticeship) supports learning by enabling them to develop and apply knowledge in authentic domain activity (Brown et al., 1989). For Lave (1988), it is a model for cognitive development as social engagements in a real-world context in which knowledge and skills are obtained and applied are essential.

Lave and Wenger (1991) introduced the concept of "communities of practice" (CoPs)[7] in which knowledge and practice are situated. Based on this concept, they propose that learning is an interactive social process called "legitimate peripheral participation" (LPP) by which newcomers become a part of a community (i.e., CoP). LPP occurs when the newcomers move from the peripheral boundary of a particular community to its centre, as they become more active and experienced in the domain and assume the roles of experts or old-timers (Lave & Wenger, 1991). Through LPP, newcomers learn by collaborating with others and by working with experts or more experienced members, and gradually begin to adopt the practices of the community. For Lave and Wenger (1991), learning is a process of social participation and collaboration understood as LPP

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[7] Lave and Wenger (1991) described a community of practice (CoP) as "a set of relations among persons, activity, and world, over time and in relation with other tangential and overlapping communities of practice" (p. 98). Wenger (1998) further explained it as a group of people who share an interest in a domain and are bound together into a social entity by what they do and by what they have learned through their mutual engagement in activities that creates a bond between them.

in a community of practitioners is the most fruitful way of learning. As Lave (1988) noted, "apprentices learn to think, argue, act, and interact in increasingly knowledgeable ways with people who do something well, by doing it with them as legitimate, peripheral participants" (p. 2).

Like social constructivism, situated learning, which focuses on social interaction, has implications for learning in formal education contexts, as well as in OLCs. According to Collins et al. (1989), situated learning creates an opportunity for students to achieve meaningful tasks and solve meaningful problems in an area that reflects their personal interests. In a situated learning process, students acquire knowledge actively rather than simply receiving it. They also learn from different authentic circumstances under which their knowledge can be applied. "Learning in multiple contexts induces the abstraction of knowledge, so that students acquire knowledge in a dual form, both tied to the contexts of its uses and independent of any particular context. This unbinding of knowledge from a specific context fosters its transfer to new problems and new domains" (Collins et al., 1989, p. 487).

Herrington, Oliver, Herrington, and Sparrow (2000) suggest some guidelines for applying situated learning to online learning environments. This includes providing group tasks that require students to engage in social practice and solve real-world problems. Involvement by teachers themselves can also benefit this process. Because of their mastery of knowledge of the field, teachers as old-timers assist students with scaffolding or coaching techniques to support students as newcomers to move towards the full participation in learning communities. Besides, providing access to experts or learners at various levels of expertise as well as opportunities to share stories in online communities of learners can support cognitive development derived from multiple perspectives.

Based on the learning theories previously described, social interaction is seen as the key to effective learning processes and outcomes. It must take place in a context where people can interrelate and utilise knowledge and skills to achieve their learning goals. Communities, as defined by many educators (e.g., Palloff & Pratt, 1999), are an ideal place to allow active and meaningful social interaction to occur. As another building block of OLCs, the concept of community is described in the following section.

2.3 Community

While many scholars have striven to describe the most significant parts of a community, various definitions are currently in use. Community means different things to different people (Thurlow, Lengel, & Tomic, 2004). Some scholars define community as an institutional structure that performs tasks to serve certain needs and achieve specific objectives (e.g., Effrat, 1974). Some describe it as a place in which social systems take place (e.g., Parsons, 1960) or a socialisation process which is not constrained by a physical location (e.g., Wellman, 1997). "To some extent, community is a group of people bound together by certain mutual concerns, interests, activities, and institutions" (Talbott, 1995, p. 65) to share information, knowledge, and experiences, on a subject of common interest (Preece, 2000). Rather than a physically visible location, community in this research is defined by three basic elements: people as community members, common interests or goals, and social interactions that link the members.

Having said that, community is not just a group of people gathering around. The important parts of community are the social elements, which a group does not necessarily possess (Haythornthwaite, Kazmer, Robins, & Shoemaker, 2000; Preece, 2000; Rovai, 2002). These elements include mutual interdependence among members, a sense of belonging, connectedness, spirit, trust, interactivity, common expectations, shared values and goals, and overlapping histories among members (Rovai, 2002).

Traditionally, communities are associated with geographical location, where friends, neighbours, colleagues, and family gather to live, work and play (Jones, 1995b). Although it is common to define communities based on their geography and local proximity, many researchers (e.g., Preece, 2000; Rheingold, 2000) accept that this traditional concept is now limited in scope. With the advent of technologies available to support communication over a distance, communities today are based on commitment, involvement, and shared values, and no longer restricted to physical location (Palloff & Pratt, 1999). Social relationships and activities among community members now have to be supported over a long distance. As Preece (2000) states, "people today rely much less on locally based relationships than fifty years ago" (p. 175). Therefore, a concept of communities supported by communication technologies called "online communities" has emerged.

Although the definitions of online communities vary and the concept cannot be defined clearly, like the traditional ones, some useful guiding definitions have been suggested. Rheingold (2000) describes online communities as "social aggregations that emerge from the net when enough people carry on… public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace" (p. 6). In other words, online communities are group of people who interact with each other via computer-mediated communication tools connected over networks. According to Preece (2000), an online community consists of:

- People, who interact socially as they strive to satisfy their own needs or perform special roles, such as leading or moderating;
- A shared purpose, such as an interest, need, information exchange, or service that provides a reason for the community;
- Policies, in the form of tacit assumptions, rituals, protocols, rules, and laws that guide people's interactions;
- Computer systems, to support and mediate social interaction, and facilitate a sense of togetherness (p. 10).

Like the traditional communities, people are also the foundation of online communities. They come together with a common purpose and experience a certain length of active social interaction using communication technologies, computers and the Internet in this case. The value comes with social interaction among people in the communities. True online communities can never happen if their members do not actively interrelate and engage for long enough to develop an interpersonal relationship and a sense of community.

2.3.1 Community development

Communities have their own life cycle. "Like other living things, communities are not born in their final stage, but go through a natural cycle of birth, growth, and death" (Wenger et al., 2002, p. 68). Wenger (1998) describes the development of communities based on the concept of CoPs through five major stages: potential, coalescing, active, dispersed, and memorable (Figure 2).

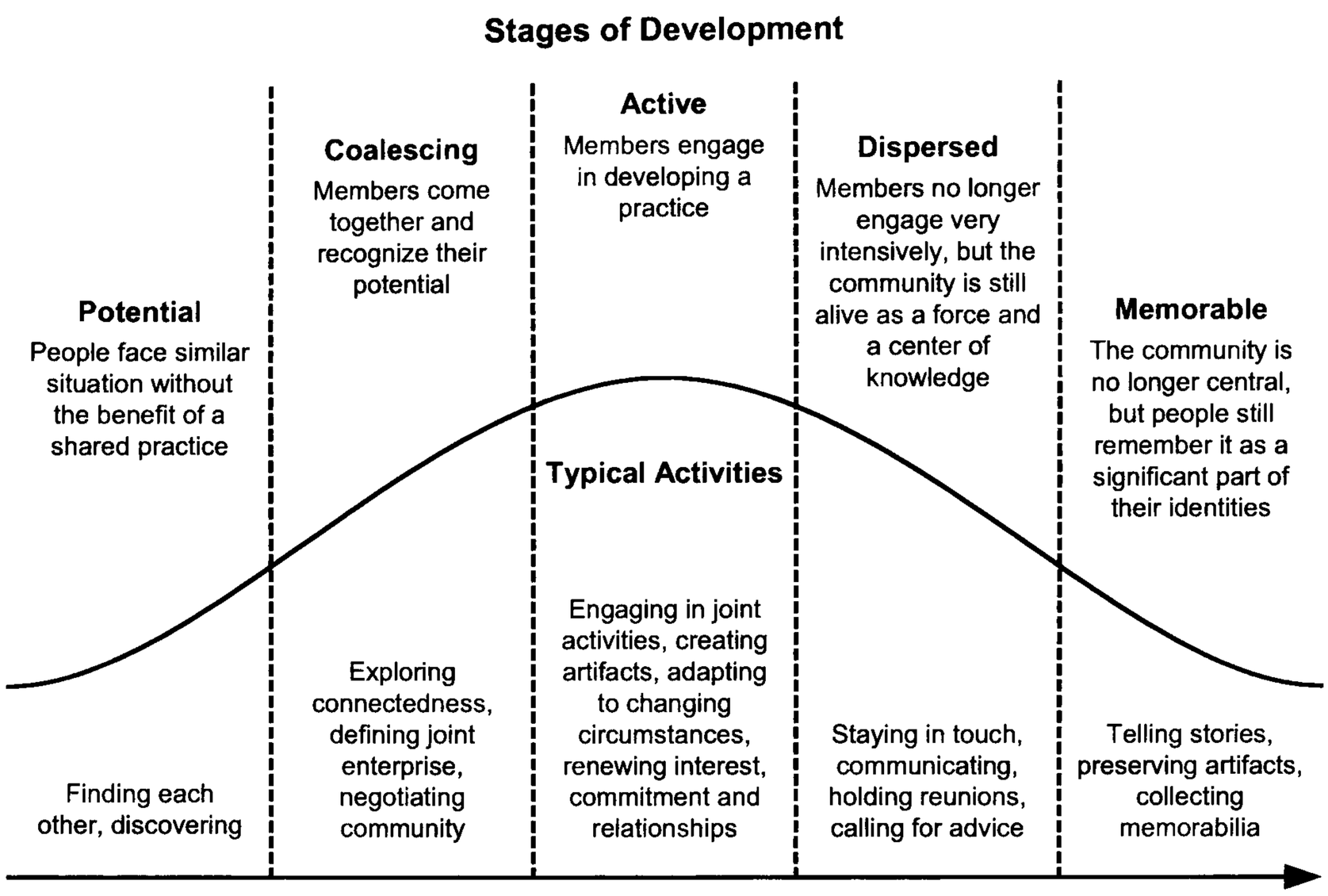

Figure 2 Stages of CoP development (Wenger, 1998)

According to Wenger (1998), a community initially starts as loose networks that hold the potential of becoming more connected among people in the community. In the first stage, people who are drawn together face similar situations without the benefits of a shared practice. As people begin to build their connections, they join and recognise the potential of other members in the community. Once formed, members of the community actively engage in developing common practice and sharing knowledge. The community becomes active for a period of time and then goes to the dispersed stage, in which members are no longer heavily involved. However, the community still exists as a force and a centre of knowledge. In the final stage, the community becomes disengaged and no longer central, but its members still recognise each other's potential and consider the community as a significant part of their identities.

Although used to describe the development of CoPs, these stages can be applied to different types of communities, including those in education. The concept of learning communities derived from the notion of community and the pedagogical framework that emphasises the importance of social interaction is described in the following section.

2.3.2 Learning communities

Learning communities have been described by many educators (e.g., Barab, MaKinster, & Scheckler, 2004; Harasim et al., 2001; Hiltz, 1998; Sallis & Jones, 2002) as venues for active collaboration and dynamic knowledge construction and sharing. The interactions in learning communities create friendship, intellectual stimulation, and personal satisfaction among individuals (Harasim et al., 2001). Rowntree (1995) further notes that in learning communities, "students are liable to learn as much from one another as from course materials or from the interjections of a tutor. What they learn… is not so much product (e.g. information) as process – in particular the creative cognitive process of offering up ideas, having them criticised or expanded on, and getting the chance to reshape them (or abandon them) in the light of peer discussion" (p. 207)

Several terms have been proposed to describe such learning environments, such as communities of inquiry (Lipman, 1988), communities of learners and thinkers (Brown & Campione, 1990), knowledge building communities (Scardamalia & Bereiter, 1994), and practice fields (Senge, 1994). However, like other communities, learning communities are based on three basic elements described earlier—people, common interest, and social interaction—as well as other social factors (see Rovai, 2002). People involved in learning communities are mainly students and tutors. To some extent, they join together because of their common interests or goals, such as fulfilling personal drives, gaining new knowledge, acquiring new connections, and meeting obligations to employers (Palloff & Pratt, 1999). In such communities, social interaction is a key element that allows the learning process to occur (Palloff & Pratt, 2003).

Based on their research in education, sociology, and anthropology, Barab and Duffy (2000) indicate three common characteristics of communities (Table 1), which can also be applied to describe the attributes of learning communities. A community has a shared cultural and historical heritage that includes common goals, beliefs, and stories among community members. The old-timers (e.g., teachers) hand on their experiences and expertise through different techniques, such as storytelling, allowing the newcomers (e.g., students) to construct meanings and identities of the community. According to Barab and Duffy (2000), individuals view themselves as a part of the community as well as of a larger system. The community itself also performs as an interdependent entity working in relationship with other communities in a connected system. This

interrelationship provides the meaning and purpose to both the community and its members. Finally, a community is also capable of generating new members. The newcomers engage with the old-timers and move from the peripheral position to the core of the community through social practice and the process of enculturation.

Common Cultural and Historical Heritage	Communities go beyond the simple coming together for a particular moment in response to a specific need. Successful communities have a common cultural and historical heritage that partially captures the socially negotiated meanings. This includes shared goals, meanings, and practices.
Interdependent System	Individuals are a part of something larger as they work within the context and become interconnected to the community, which is also a part of something larger (the society through which it has meaning or value). This helps provide a sense of shared purpose, as well as an identity, for the individual and the larger community.
Reproduction Cycle	It is important that communities have the ability to reproduce as new members engage in mature practice. Over time, these newcomers come to embody the communal practice (and rituals) and may even replace old timers.

Table 1 Characteristics of a community (Barab & Duffy, 2000, p. 37)

Founded on the same theoretical framework, learning communities have much in common with the idea of CoPs in that these two contexts centre on a chance for students to engage actively in negotiation of meanings through social interaction. Having said that, learning communities are not CoPs and there are some differences between the two concepts.

Barab and Duffy (2000) point out some dissimilarities between CoPs and their notion of practice fields. They note, "learning through participation in practice fields frequently involves students working collaboratively in a temporary (as opposed to a sustained and continuously reproducing) coming together of people (as opposed to a community of practitioners with a substantial history) around a particular task (as opposed to a shared enterprise that cuts across multiple tasks considered to be the workings of the community)" (p. 40). In addition, unlike other types of communities, learning communities are artificially constructed and can be more rigid. Members of a learning community may be required to participate actively in a shared activity while members of the other communities seem to have more choice of whether they just want to observe or to be involved with others (Barab & Duffy, 2000).

Recently, the concept of learning communities has not necessarily been restricted to physical locations (Palloff & Pratt, 1999). With communication technologies, traditional learning communities, where social interaction usually occurs face-to-face, are now becoming virtual learning communities taking place in online settings irrespective of distance and time. The technologies that facilitate the creation of such communities are described in the following section.

2.4 Communication technologies

Nowadays, the development of computing and network based technologies, as well as the proliferation of computer applications, has increased the attention paid to exploring the ways to support teaching and learning processes (Gunawardena & McIsaac, 2003). These technological changes allow many educational institutions to offer various academic programmes at reasonable costs, regardless of location (Rumble, 2000). They also provide better opportunities for people to learn and discover new knowledge. Also noted by Jain (1997), "not only is technology being used to extend educational opportunities to populations and communities previously underserved, but it is also transforming the way and form in which learners are absorbing knowledge". In conjunction with the concept of learning communities, these technological innovations can create new paradigms that challenge the brick-and-mortar versions and support the transformation of traditional learning communities to OLCs.

Technologies, such as ACMC, offer advantages to accommodate the busy schedules of distance learners as they provide a time-delayed feature that allows them to participate and respond at their convenience. More advanced technologies, such as videoconferencing, which utilises audio, video, and computing technologies, allow people at various locations to see and hear each other at the same time. Because of the richness of a medium that can transmit voice, graphics, and images, videoconferencing can create a sense of social presence closely similar to face-to-face interaction (McIsaac & Gunawardena, 1996).

However, advanced technologies do not necessarily represent better online learning implementations (Hanson et al., 1997). Much literature in this area calls for the simplicity of the media used to support teaching and learning activities among online members in OLCs. According to Harasim et al. (2001), "although more complex and

advanced technologies are available, it is not a matter of very complex systems being better than very simple systems. Rather, the issue is what is suited to the learning objectives and the budget" (pp. 15-16). As also emphasised by Laurillard (2002), "at the beginning of the twenty-first century, there are still major technical constraints on the communication that is possible over networks. The technology exists to carry high-information content across the world, but the infrastructure needed to support it is expensive and physically difficult to install" (p. 147). At present, high bandwidth communication is "less likely to be immediately usable by most teachers and institutions" (McConnell, 2000, p. 27). With asynchronous features and text-based characteristics, ACMC is still today's most common technology used to support communication in OLCs.

2.4.1 Asynchronous text-based computer-mediated communication (ACMC)

Applications of ACMC are varied but most of them include e-mail, electronic bulletin boards, computer conferencing, and online databases (see Bates, 1995). The most fundamental unit of ACMC is an e-mail system in which a message can be saved, read, replied to, and forwarded over networks (Hiltz, 1995). E-mail is useful to support personal communication among participants in OLCs. Students can send a personalised e-mail to their tutors asking questions or to other class members discussing a particular topic. Tutors can use it to encourage students' participation or help students with a particular concern. Group communication is possible using e-mail, although it is not very suitable for supporting large groups of people (McConnell, 2000).

ACMC also offers a shared communication space, such as electronic bulletin boards that allow participants to post messages in a public area permitting others to read and share ideas. Although supporting communication and the exchange of learning materials among OLC members, a bulletin board system provides a limited and very simple group communication facility (Harasim et al., 2001). In addition to e-mail and bulletin boards, ACMC provides conferencing features that support online collaborative work and group discussions (Kaye, 1995). Like taking part in a normal conference, a computer conferencing system is designed for highly interactive communication in a format that is easy for conversation to be developed (McConnell, 2000). It provides various functions that support a wide range of group activities. In a conferencing system, messages are

linked to form threads of discussions stored on the host computer until individuals access to read and reply to them (Kaye, 1989). Finally, ACMC provides online databases; participants can access a variety of existing public or private databases held on other networked computers at any time or any place (Kaye, 1989).

Over the years, ACMC has been widely adopted as an effective instructional means to support learning over a distance (Harasim et al., 2001). The results from many research studies (e.g., Gunawardena, 1995) show that online participants have considered ACMC an interactive medium that can be used to support collaborative learning in online environments. Now, even very basic learning platforms (e.g., WebCT®) integrate ACMC applications, such as computer conferencing, as essential features for online communication.

2.4.2 How can ACMC support OLCs?

ACMC can be used in many ways to support learning communities over a distance. It is probably one of the most basic tools that community members use to form and maintain their relationships (Hiltz & Wellman, 1997). According to Hiltz (1998), ACMC may be used simply to create a newer version of a correspondence course that provides only a limited one-to-one communication between students and tutors. Through ACMC, educational institutions can apply the original pedagogical framework for a mass production of correspondence that supports a large volume of students. In this way, ACMC can be utilised to create a learning network that allows students to collaborate and learn from each other while tutors can work closely with students to guide them and hand on their expertise (Hiltz, 1998). For that reason, learning mediated by ACMC can become more active, interactive, and meaningful (Gunawardena, 1995).

In OLCs, ACMC facilitates critical academic discourse among online participants by allowing them to construct an argument, acquire supporting evidence, and evaluate others' work. With ACMC, students who are physically separated can engage actively in knowledge creation and sharing processes (Bates, 1995). Some techniques that apply a cognitive apprenticeship framework to support online learning include building necessary knowledge domains and scaffolding cognitive process by associating students with the area experts (Teles, 1993).

Because of the text-based nature of ACMC, students are encouraged to develop systematic reflection and creative writing skills (Bates, 1995). Asynchronous features also provide online students with more time to reflect and construct new knowledge before contributing to class discussion (Harasim et al., 2001; Mason, 1994). As Palloff and Pratt (2001) note, "some students who are not noisy learners in the face-to-face classroom can flourish online because they have the luxury of time for reflection and response and do not have to compete with more extroverted students in order to be heard" (p. 107). ACMC is therefore a supportive tool for students who prefer a reflective learning style and also those using English as a second language (Moore & Kearsley, 1996). Because visual cues are absent, it is claimed that ACMC eliminates social barriers and increases equal participation among online students (Hiltz & Wellman, 1997). According to Zellhofer, Collins, and Berge (1998), students with physical disabilities may feel more comfortable participating in online space where contextual cues are missing.

Often, the use of ACMC is combined with face-to-face contacts as a means to support online teaching and learning processes (Harasim et al., 2001). Some online programmes often require students to have some face-to-face meetings and personal interactions. Sessions such as lectures, seminars, and workshops offer students an opportunity to meet face-to-face with faculty members and to develop personal contacts with other fellow students. It is also possible that certain objectives can only be achieved by meeting face-to-face. As McIsaac and Gunawardena (1996) note, "when course objectives require the careful demonstration, observation, practice and feedback of life threatening procedures such as a surgical procedure, it is important to organize face-to-face meetings" (p. 410).

2.4.3 Limitations of ACMC

Although ACMC provides a great potential to support teaching and learning in OLCs, some limitations derived from its characteristics are recognised. Its major drawback is probably the lack of nonverbal cues and contextual information, such as facial expression, gesture, and tone of voice. In other words, it is considered a lean medium that has fewer communication channels than face-to-face communication and other media (Daft & Lengel, 1986). This characteristic makes ACMC low in social presence (Hiltz, 1998; Walther, 1992), making learning in online settings impersonal and de-motivating. "When the medium is the written word, establishing social presence can be

problematic" (Garrison & Anderson, 2003, p. 29). For example, social presence through verbal behaviours, such as phatics[8], is very limited in ACMC situations. Feenberg (1989) also points out that the lack of phatic expression in ACMC-based learning "is aggravated by the asynchronous character of the medium" (p. 24). This situation is made worse by the nature of OLCs in which communication and learning activities can be both temporally and geographically distributed. According to Sproull and Kiesler (1986), the absence of social cues in ACMC situations also reduces the normative constraints allowing uninhibited behaviours, such as flaming[9], to occur.

Although providing flexibility over time, the asynchronicity of ACMC can result in delayed feedback that produces frustration (Hiltz, 1998), inappropriate turn-taking, and overlapping exchanges (Herring, 1999) among participants in OLCs. Such gaps within exchanges can affect the continuity of communication, leading to a lack of interactional coherence (Herring, 1999). According to Lea, O'Shea, Fung, and Spears (1992), delayed response in ACMC environments can also decrease the social presence of the others in the conversation. Finally, because of its text-based nature, ACMC is not suitable for reaching a consensus or solving conflicts between a large group of people. The literature indicates that although ACMC is sufficient when messages are very simple or unequivocal, it does not have the capacity to support highly social and affective communication (Feenberg, 1989). Hiltz and Wellman (1997) note that ACMC "seems good for giving and receiving information, opinions, and suggestions; it is less suited for communicating agreement and disagreement; and it is worst for social-emotional tasks involving conflict and negotiation".

While ACMC allows people over a distance to connect, the drawbacks inherent in the nature of the medium can make an online learning process less effective. In addition, some concerns about constraints that potentially affect learning in online contexts still exist. Learning in OLCs means there are fewer social opportunities for online members

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[8] The communication used to establish an atmosphere or maintain social relationships rather than to impart information (e.g., "Not a good performance from Chelsea yesterday was it? But then 9 points clear at the top they can afford a slack game☺").

[9] Flaming is uninhibited verbal behaviours (e.g., posting aggressive messages, offensive comments, inappropriate words, negative remarks, etc.) caused by the absence of social and contextual cues in ACMC.

to engage in face-to-face meetings. It may also involve time, cultural, and language differences that make a smooth and effective online learning process difficult to establish. These constraints are further explained in the next chapter (see Section 3.4).

2.5 Conclusion

Throughout this chapter, social interaction has been regarded as a key component in all aspects of OLCs and learning in such contexts. From the literature, it can be seen that learning is enhanced when students are engaged in active interaction and collaborative discussions with others. The previously described educational theories that underlie the concept of OLCs, are based, to some extent, on the value of social interaction with others. Piaget's constructivism, for example, places an emphasis on active knowledge construction and socio-cognitive conflict derived from peer collaboration. Vygotsky's social constructivism, similarly, focuses on the role of social interaction with more capable peers, which helps individuals advance through their ZPD.

Although such interaction can be supported by various tools (e.g., computer conferencing) and techniques (e.g., face-to-face sessions, etc.), a learning environment that allows this process to occur is also considered important. Put more simply, effective social interaction requires an environment that supports meaningful engagement and allows the exchanges of ideas to occur dynamically. It has been claimed that communities that are supportive of social interaction among participants are the ideal place for learning. Constructive social interaction among participants in learning communities improves not only intellectual outcomes, but also social capital that serves the real purpose of learning.

Recently, the concept of communities as well as learning communities has not been restricted to physical locations. As communities become virtual, a number of technologies have been designed to facilitate group communication in cyberspace. In the educational domain, such technologies as ACMC can be used to facilitate learning activities and promote interactive communication among students and teachers in OLCs. Although it cannot be guaranteed that students will gain all the benefits from interaction with others in such contexts, OLCs can be places where meaningful interaction can be developed to support constructive online learning processes and outcomes.

CHAPTER 2 ONLINE LEARNING COMMUNITIES (OLCs)

The next chapter describes further social interaction in OLCs. Two types of social interaction commonly found in the literature are presented. Some other social factors, such as identity, trust, and personal relationships, which are considered important elements of online social interaction, are discussed. Some basic constraints that potentially inhibit effective social interaction in OLCs and the role of face-to-face contacts to support the interaction process are also described.

CHAPTER 3

Social interaction and factors in OLCs

In Chapter 2, the foundations of OLCs were identified and the notion that social interaction plays a vital part in every aspect of OLCs was introduced. In this chapter, social interaction among online participants is further described. Other issues that affect effective social interaction and learning in OLCs, such as social factors, potential constraints, and face-to-face interaction, are also presented.

3.1 Introduction

Based on the learning theories described in the previous chapter, social interaction is considered an important aspect of cognitive development and the learning process. The significance of social interaction has been emphasised in many research studies in education for several decades (Egan, Welch, Page, & Sebastian, 1992; Flanders, 1970; Fulford & Zhang, 1993; McCroskey & Anderson, 1976). For example, social interaction can enhance the quality of learning by developing an environment that supports critical thinking and meaningful collaboration (Milheim, 1995). The feedback students receive from others indicates whether they have understood correctly or how well they have learned (Bates, 1995).

Similarly, the concept of social interaction is important when it comes to the effectiveness of online learning (McIsaac & Gunawardena, 1996) and the development of OLCs (Rovai, 2002). Interaction in OLCs is not limited only to human-to-human contact as online participants may interact with learning materials and communication media interfaces (Hillman, Willis, & Gunawardena, 1994; Moore, 1993; Moore & Kearsley, 1996). However, it is the "social" interaction that is considered the essence of meaningful and constructive learning (Moore & Kearsley, 1996). As Palloff and Pratt (1999) emphasise, "keys to the learning process are the interactions among students themselves, the interactions between faculty and students, and the collaboration in learning that results from these interactions" (p. 5). Therefore, two types of social

interaction that become the focus of this research are student-teacher and student-student interactions. The former is the social mode of communication that provides motivation, feedback, and dialogue between teachers and students. The latter, on the other hand, is the exchange of information and knowledge through dialogue that occurs between students in both a structured and non-structured manner (Moore, 1993). The following section describes each type of social interaction in detail.

3.2 Social interaction

3.2.1 Student-teacher interaction

Based on Vygotsky's social constructivism (see Section 2.2.2), social interaction with more capable persons is essential for assisting less capable persons in advancing through their ZPD. In other words, through social interaction, individuals can achieve higher cognitive levels by closing the gap between what they could accomplish by themselves and what they could accomplish in cooperation with others (Vygotsky, 1978). In an educational context, teachers, tutors, or instructors can be regarded as more competent persons who provide helpful guidance to students and help facilitate the learning process. The literature suggests that a higher level of student-teacher interaction results in higher levels of students' achievements and attitudes towards learning (Flanders, 1970). Advanced communication between students and teachers provides students with opportunities to develop critical thinking from teachers' constructive criticism (Holmberg, 1986).

The significance of social interaction with teachers in online settings is also emphasised by many educators (e.g., Anderson, Rourke, Garrison, & Archer, 2001; Collins & Berge, 1997; Garrison & Anderson, 2003; Palloff & Pratt, 1999). Sufficient student-teacher interaction creates an appropriate degree of exchange of ideas and information (Moore & Kearsley, 1996). Timely feedback and frequent contact with teachers also allow students to become active online participants (Coldeway, MacRury, & Spencer, 1980; Egan, Sebastian, & Welch, 1991). However, student-teacher interaction in online classroom environments is different from that of the traditional ones. In traditional classes, teachers are physically present and can provide feedback through visual and verbal cues. The situation is dissimilar in online environments where the interaction is usually mediated by communication technologies.

Based on the literature, online teachers use various tools and techniques to provide appropriate feedback, keep students motivated to learn, and maintain active dialogue over a distance (Moore, 1993). Communication tools, such as computer conferencing, can be used to support group discussions while e-mail can also be used to provide personal advice to each student (Feenberg, 1989). However, technologies are just a part of the equation. Effective student-teacher interaction in OLCs depends on various factors including the role of teachers in such contexts. Anderson et al. (2001) define three categories in order to describe the basic roles of teachers in online learning environments: administrative, facilitative, and instructive roles. Online teachers perform administrative functions, or organisational roles (Berge, 1995; Collins & Berge, 1997; Mason, 1991) (e.g., setting objectives, requirements, activities, and procedures), to support the students' learning process. Just as in a face-to-face course, online teachers need to organise and provide students with all necessary information about the course to make learning effective and successful (Mason, 1991).

Many researchers (e.g., Kaye, 1995; Salmon, 2000; 2002) also emphasise the critical role of online teachers in facilitating and moderating the learning process. The facilitating role allows online teachers or tutors to generate a positive effect on learning as they can help students actively engage in class discussions (Salmon, 2000). Online teachers can create a friendly and social environment for learning by sending a welcoming message at the beginning, encouraging active participation throughout the course, and providing helpful feedback on students' inputs (Mason, 1991). This role also includes promoting personal relationships and developing group cohesiveness (Berge, 1995).

Finally, online teachers perform the instructive roles in OLCs (Anderson et al., 2001). The importance of online teachers as the subject experts is emphasised by many researchers (e.g. Moore & Kearsley, 1996). Too little input from teachers can be problematic for the quality of the online learning process and outcomes (Jones & Issroff, 2005). In online learning situations, as in science education, teacher intervention in the learning process is essential. As Jones, Scanlon, and Blake (2000) note, "if students were discussing the transmission of nerve impulses, it would be at the least unhelpful not to intervene if there were a factually incorrect summary" (p. 215). Moore and Kearsley (1996) also emphasise the vital role of teachers in responding to students' application of new knowledge. They note that students can be "vulnerable at the point of application

since they do not know enough about the subject to be sure they are applying it correctly, or as intensively or extensively as is possible or desirable, or that there are potential areas of application they are not aware of" (p. 131).

3.2.2 Student-student interaction

Effective learning occurs when interactions are not limited to student-teacher communication but communications among students themselves (Rovai, 2002). Based on the learning approaches (e.g., social constructivism) that view learning as a social process and knowledge as a social construct, the focus seems to shift from student-teacher to student-student interaction (Hiltz, 1998). This type of interaction is probably the most important as it performs several functions that positively affect learning (Bates, 1995; Johnson, 1981; Moore & Kearsley, 1996). According to Johnson (1981), constructive interaction among students is a significant determinant of educational success. It can influence learning motivations and help students gain the social competencies necessary to reduce social isolation. Student-student interaction (e.g., sharing experience and understanding, trusting, providing support) also has the potential to strengthen a sense of community (Rovai, 2002). This type of interaction can be found in various forms, such as collaboration, discussion, inquiry, and social communication (Moore, 1993).

According to Scardamalia and Bereiter (1990), active interaction among students in the learning process is essential for the success of any online learning implementation. Such interaction is also considered a foundation of learning communities in online contexts as it helps develop social cohesion and a sense of community among online students (Palloff & Pratt, 2001; 2003; Rovai, 2002). In terms of intellectual competency, students working together in online contexts can generate deeper levels of understanding and critical evaluation of the course materials (Scardamalia & Bereiter, 1990). Webb (1982, in Harasim, 1989) suggests that collaboration with peers helps online students learn "through mechanisms directly affecting cognitive processes, such as actively

constructing knowledge through verbalisation, cognitive restructuring, and/or conflict resolution" (p. 52)[10].

To promote social interaction among students in online contexts, various collaborative learning tasks, such as seminar-style presentations and discussions, debates, simulations, role plays, case studies, and so on, can be applied[11] (Harasim et al., 2001; Hiltz & Turoff, 1993). Online teachers or tutors can also play an active part to provide students with opportunities to engage in these pedagogical activities in order to promote a meaningful interaction in online courses (Palloff & Pratt, 1999). Communication media can also provide possibilities to perform collective tasks among online students at diverse locations (Bates, 1995). Using synchronous tools, students can meet through such applications as videoconferencing that allow online participants in distributed learning communities to see and hear each other, and work together. Using less advanced tools, such as computer conferencing, community members are allowed to participate in discussions at times convenient to themselves (McIsaac & Gunawardena, 1996).

To summarise, there has been an increasing focus on the effectiveness of online learning over recent years. A key element is the social interaction among participants that enhances the quality of online learning. As described in the previous chapter, social interaction plays a vital role in the formation of OLCs. According to Palloff and Pratt (1999), collaborative OLCs are impossible without joint efforts and active involvements among online participants. From the literature, it is also evident that factors such as identity, trust, and personal relationships are indispensable for effective interaction in OLCs. These factors make social interaction among online members easier and smoother, especially at the early stage of OLC development. However, social interaction as well as the creation of these social factors can be problematic in online contexts. Some constraints, such as space, time, culture, and language, can potentially discourage this developmental process. In many cases, face-to-face interaction is organised to

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[10] According to Piaget's constructivism (see Section 2.2.1), the resolution of conflict induced by peer collaboration re-establishes the state of cognitive equilibrium and generates the cognitive development of an individual.

[11] Paulsen (1995) also combines a list of pedagogical techniques that can be used to support collaborative learning among online learners. See "The online report on pedagogical techniques for computer-mediated communication" at http://www.nettskolen.com/forskning/19/cmcped.html. Retrieved 06 September 2004.

support online activities because it is believed to provide a positive learning experience for online participants. The following sections of this chapter discuss each of these issues in detail.

3.3 Social factors

Although social interaction offers positive impacts on learning, high quality interaction in online settings can be more challenging than that in normal situations because it occurs mainly over a distance and it is usually mediated by narrow-bandwidth media, such as ACMC (Muirhead, 2000). This situation can result in learning isolation and inactive participation, which adversely affect the online learning process (Hughes & Hewson, 1998).

In order to minimise the feelings of isolation and enhance social interaction among online members, some social factors are of importance and need to be established at the beginning of OLC development. Some like identity, trust, and personal relationships are considered basic components of effective online interaction. People will not participate collaboratively in an online community if they do not know to whom they are talking. A certain degree of identity and trust is therefore essential. Having strong personal relationships also allows members in a distributed learning community to enthusiastically share knowledge and collaborate. This section describes these social factors in greater detail.

3.3.1 Identity

According to Smith and Kollock (1998), identity is a basic building block of social interaction. Wenger (1998) also places identity as a primary focus of learning in a community. Yet, the definitions of identity are varied. Hogg and Abrams (1988) define it as "people's concepts of who they are, of what sort of people they are, and how they relate to others" (p. 2). It shows "the ways in which individuals and collectivities are distinguished in their social relations with other individuals and collectivities" (Jenkins, 1996, p. 4). Identity in this research is mainly used in two related meanings—personal and social identities. These two types of identity are closely related to each other and share many attributes. As Jenkins (1996) emphasises, "the *individually unique* and the *collectively shared* can be understood as similar (if not exactly the same) in important respects" (p. 19).

Personal identity is a set of attributes, beliefs, or principles of action that differentiates an individual in a socially relevant way, and that an individual takes pride in. Social identity, on the other hand, is a social category distinguished by membership rules and sets of characteristic features. It can be seen as the way people understand themselves in relation to others, and how they view their past and future (Peirce, 1995). In OLCs, personal identity (how people think and act as a unique individual) and social identity (how people think and act as a part of the group) do not always conflict but collectively interplay. They need to be established in learning communities because they help people create an initial form of trust and personal relationships. The disclosure of identity not only helps community members to recognise each other, but also allows them to collaborate and exchange their knowledge more efficiently. Based on the concepts of CoP (Lave & Wenger, 1991; Wenger, 1998), the development of identity is fundamental to the LPP process of students in OLCs. While students as newcomers engage in both intellectual and social practice in order to become full members of the learning community, they develop and maintain their own identity as well as new knowledge and skills.

Although identity should be promoted in OLCs, it is not easy for online members to get to know one another over a distance (Smith & Kollock, 1998). Wenger (1998) also admits that the dynamics of identity will become more complex in international communities. Many online programmes therefore adopt face-to-face interaction as a compulsory component in order to verify students' identities and strengthen relationships in an online class where social cues are limited (Levinson, 1989). Some communities have pictures of all their members posted on the website, along with personal biographical details. This makes it easier for community members to remember who is who (Wenger et al., 2002). Having community members on the screen may end anonymity and create social presence in OLCs. Developing a classroom homepage that covers information about the class (e.g., syllabus, exercises, and references) and providing links to individuals' websites can be very useful. Personal stories also help to remind all members in OLCs that a real person exists behind the electronic trail.

3.3.2 Trust

Apart from identity, trust is another basic social element that should be established to support interaction among members in any type of community. Like other social terms,

trust has many different aspects and meanings. According to Fukuyama (1995), "trust is the expectation that arises within a community of regular, honest, and cooperative behaviour, based on commonly shared norms, on the part of the members of the community" (p. 26). Trust is closely linked to identity in that it requires some forms of identity. In other words, trust happens among people when they are not complete strangers. As emphasised by Handy (1995), "it is unwise to trust people whom you do not know well, whom you have not observed in action over time, and who are not committed to the same goals". Relationships and social interaction among people in a community also involve some levels of trust (Preece, 2000). Therefore, finding ways of creating trust is important.

In OLCs, where communication and social interaction are mediated through technologies, trust also plays an important part. It facilitates the sharing of knowledge and expertise and also encourages active participation among people in learning communities (Rovai, 2002). Exchanging some sort of information and knowledge, especially when risk is involved, also requires a higher degree of trust (Rocco, 1998). Moreover, people are likely to share knowledge if they are willing to do so; otherwise, the knowledge sharing process is much less efficient. McConnell (2002) also makes the following point "in trustful situations people are more likely to take risks with their learning, to push themselves and others beyond their present boundaries. This can be highly developmental, as well as more likely to produce useful insights into the groups' learning processes" (p. 252).

However, building trust online is difficult and challenging (Handy, 1995). Communication using computer-mediated tools can ruin trust among online members (Ishaya & Macaulay, 1999). According to Wenger et al. (2002), members in distributed communities have to work hard to create a base of trust because they have less contact due to different time zones and geographical separation. Nevertheless, trust in online environments is possible. Although it seems to be fragile and temporal, Jarvenpaa, Knoll, and Leidner (1998) suggest that swift trust[12] can be established among online

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[12] Swift trust (Meyerson, Weick, & Kramer, 1996) is a concept of trust in temporary teams (e.g., OLCs) formed around a shared purpose and a limited time-span. It takes place when zero-history team members suspend their suspicions about the other members and swiftly rely on them to deal with the common task at hand.

participants through ACMC applications, such as e-mail. Shneiderman (2000) also proposes a model for making trust possible in online communities. He suggests that to facilitate trust online, people have to make clear the context in which interactions will occur, state open and clear commitments, and always recognise that trust involves taking a risk. According to Goleman (1995), encouraging members to be responsive and dependable also helps create trust. However, they must fully recognise that trust is valued in the community.

3.3.3 Personal relationships

Communities and social interaction in communities rely on personal relationships for their growth (Preece, 2000). Good relationships remove distrust and fear, and break down personal and organisational barriers (Von Krogh, Ichijo, & Nonaka, 2000). As Wenger et al. (2002) note, "knowing each other makes it easier to ask for help: You know who is likely to have an answer and you can feel confident that your request is welcome" (p. 34). In traditional face-to-face settings, people interact and gradually move towards a deeper level of personal relationships using both verbal and nonverbal behaviours (Altman & Taylor, 1973). However, in geographically distributed settings like OLCs, nonverbal and environmental aspects are significantly reduced or totally removed by space and time. Although personal relationships are a key to integrating people across physically distributed locations, online students often fail to establish strong and substantial relationships with other students and tutors. According to Wenger et al. (2002), some other constraints based on the characteristics of online communities, such as cultural and language differences, also make trust and deep relationships more difficult. For many people, connecting with others from the same cultural background is more comfortable.

To form a strong personal relationship among students, tutors as facilitators can play an important role to promote frequent, active collaboration in online learning environments (Berge, 1995). Many techniques can be applied (Harasim et al., 2001; Hiltz & Turoff, 1993). For example, online tutors can pose weekly questions or topics for the class. Students can carry out discussions using electronic bulletin boards or computer conferencing applications of ACMC. Sometimes, it is also important to encourage students to start topics of their own and allow every other student to respond freely. Small group projects can be useful as social interaction and academic discussions during

the group projects provide opportunities for students to create interpersonal contacts in OLCs (Harasim et al., 2001). Apart from student-student relationships, online tutors themselves should also create a good social rapport with their students (Mason, 1991). In this case, e-mail can be used for informal one-to-one correspondence with online students. Teachers can send personalised feedback on students' assignments, class participation, and overall progress, which allow them to improve personal relationships with other students in the class (Bates, 1995).

Just as in face-to-face classrooms, humour can also create personal relationships among participants in OLCs (Palloff & Pratt, 2001). When students feel comfortable in expressing themselves, the chance of developing strong relationships is greater. When students are able to see the teacher as a real human being, their willingness to explore and bring in new ideas increases (Palloff & Pratt, 2001). In a text-based online classroom, however, it is necessary to be very careful with humour. Without the nonverbal cues of smiling faces, it is often hard properly to detect attempts at humour (Berge, 1995; Davie, 1989).

As mentioned earlier, although social interaction is important to learning success, limitations due to the nature of some communication media can make it more difficult, or less effective, for online members to interrelate. Much literature reports that online members still have to contend with some potential constraints arising from communication over a distance (see Na Ubon & Kimble, 2002). The following section describes in detail the constraints that could potentially affect social interaction and learning in OLCs.

3.4 Potential constraints

Social interaction among students makes positive contributions to students' learning (Laurillard, 2002). However, social interaction in online situations may be more problematic. Differences in physical locations, time zones, culture, and language all persist despite the use of technologies and can cause some constraints on online communication (Olson & Olson, 2000). Geographical separation and different time zones obviously can make it more difficult for members in OLCs to connect, as they have to rely on technologies that are not full substitutes for face-to-face contacts (Preece, 2000; Wenger et al., 2002). Some other constraints, such as culture and language

differences, can also have an effect on communication and learning processes in OLCs (Wenger et al., 2002). This section describes these potential constraints in more detail.

3.4.1 Space

"Communication seems most complete and successful when the person is physically present" (Feenberg, 1989, p. 22). Face-to-face meetings provide various opportunities for immediate feedback and various cues modified to circumstances (Daft & Lengel, 1986). Social and nonverbal cues play an important role in face-to-face communication, as research shows that only 8 to 20 percent of interpersonal communication is verbal (Ruch, 1989). Nonverbal communication is also supported by much research that assumes that people are more likely to believe what they see and experience than what they read or hear (Steers & Black, 1994). However, communication in mediated environments may suffer from a lack of social cues and may be low in social presence (Walther, 1992).

In OLCs, the absence of face-to-face interactions with peers and teachers results in negative learning experiences because of working in an impersonal environment (Hughes & Hewson, 1998). In due course, the geographical separation and feelings of social isolation could possibly weaken a sense of community and increase the dropout rate among students in online programmes (Rovai, 2002). According to Preece (2000), the filtering out of social and contextual information in an online community can affect communication in three major ways. First, because interactions among online students are mediated by communication technologies, nonverbal cues necessary to understand social discourse may be missing, thus reducing the extent of feedback. In face-to-face communication, in contrast, it is easy to check if the other person understands the conversation as it progresses. Second, conversations in online environments do not have appropriate turn taking between speakers. In face-to-face contact, on the other hand, various signals (e.g., gestures and facial expressions) are used to better understand the context of the conversation and the speaker's feelings. Finally, conversations in online environments can cause widespread misunderstandings and frustration because people might never have met each other. The filtering out of contextual information in such contexts can arouse inappropriate behaviour, such as flaming (Spears & Lea, 1992; Sproull & Kiesler, 1986).

3.4.2 Time

Unlike local communities, online communities often go across national boundaries and time zones. The issue of time, synchronicity across time zones, therefore, is regarded as another potential constraint for online members (Olson & Olson, 2000). Although numbers of studies claim that it is now the post-industrial era, the standardisation of time from the industrial era still affects people's lives (Kimble et al., 2000). In fact, people are still confined to standardised time zones. For example, no participants in OLCs want to work at three o'clock in the morning every day simply to discuss learning topics with other class members from other continents. The more time zones people cross, the less chance there is that they are at work at the same time (Olson & Olson, 2000). Wenger et al. (2002) also point out, "differences in time zones often make live collaboration difficult" (p. 128). Time in virtual and online communities is, therefore, an important issue that must be considered (Kimble et al., 2000).

In an attempt to deal with time constraints, asynchronous tools, such as computer conferencing, can be used to allow members to participate in an online community at their own convenient time. However, these tools do not provide immediate real-time feedbacks from either teachers or peers (Feenberg, 1989) and cannot substitute for real face-to-face interaction (Preece, 2000; Wenger et al., 2002).

3.4.3 Culture

In addition to the physical distances and time differences, members in online communities may experience other potential barriers to effective communication and learning, such as cultural diversity (Olson & Olson, 2000; Preece, 2000). Students who come from different cultural backgrounds may also have different learning behaviours, learning goals, frames of reference, and motivation that make it difficult for them to understand what other people are trying to explain. According to Wenger et al. (2002), cultural differences can easily lead to communication difficulties and misinterpretation. Cross-cultural issues may also affect an online learning process. As noted by Palloff and Pratt (2003), "in some cultures it is considered inappropriate for students to question the instructor or the knowledge being conveyed in the course. The co-creation of knowledge and meaning in an online course, coupled with the instructor's role as an equal player in the process, may be uncomfortable for a student from this type of culture" (p. 40).

In "Working in common cross-cultural communication challenges", DuPraw and Axner (1997) describe six basic patterns of cultural differences.

- Different communication styles;
- Different attitudes toward conflict;
- Different approaches to completing tasks;
- Different decision-making styles;
- Different attitudes toward disclosure;
- Different approaches to knowing.

These fundamental differences show the ways in which people from various cultures tend to behave differently from one another. As far as attitudes toward conflict are concerned, for instance, people in Western countries are encouraged to deal with conflicts while people in many Eastern countries feel that conflict is embarrassing or humiliating (DuPraw & Axner, 1997). When it comes to approaches to completing tasks, in addition, people from different cultural backgrounds also have different approaches. People from Asian and Hispanic backgrounds are likely to develop their relationships right from the beginning of the project and then concentrate on the completion of the task. In contrast, people from American backgrounds are likely to emphasise first the task and then allow relationships to develop as the task progresses (DuPraw & Axner, 1997; Olson & Olson, 2000). Culture and language are not elements in themselves. Rather, they represent value systems, mindsets, and frames of references of students from various backgrounds drawn together in OLCs. Before the widespread use of the Internet, the impact of culture and language differences was admitted but largely ignored. Nowadays, conversely, more attention is being paid to such diversities as important factors in online learning (Preece, 2000).

3.4.4 Language

Language, also, can cause possible communication problems in online communities where people come from countries that use different languages. Language introduces a very basic barrier to communication and can strengthen cultural boundaries, even when all parties agree to speak a common language. Although English has established itself as a common medium, many people still lack the ability to understand and communicate complex concepts and reasoning in English (Van den Branden, 2001). The many

varieties of English (e.g., British, American, Australian, etc.) can make it even more difficult, sometimes confusing, for non-native speakers. Consequently, they may not understand the hints and connotations behind certain terms, or may hesitate to speak if they are not confident in expressing themselves. Because of a lack of written English skills, some foreign students may be uncomfortable or even have problems in exchanging ideas using other languages. As emphasised by Palloff and Pratt (2003), "if the text is in English, non-native English speakers may have difficulty understanding concepts presented. They may need extra time to compose responses to discussion questions" (p. 40).

Like those of culture, differences in language can also take place in smaller contexts, such as continental and regional settings. Barajas and Owen (2000) present some of the preliminary results of the study undertaken by the Thematic Network's Implementation of Virtual Environments in Training and Education (IVETTE), a consortium of nine European universities, to investigate the institutional, cultural, and learning issues involved in the implementation of innovative Virtual Learning Environments (VLEs) in educational institutions. From the study, educational and training programmes organised on a trans-European scale by various European institutions and organisations had faced problems related to the calendar and curriculum of the course, the methodologies to overcome the language barrier, the methodologies to enhance intercultural communication among teachers and learners, and the design and production of the learning materials for the course. The results from IVETTE showed that both language and cultural issues should be regarded as an integral part of the whole learning process, and they should be viewed as important factors in the ongoing process of negotiating meaning in OLCs.

3.5 Face-to-face interaction

Face-to-face contact is important for social interaction and learning in OLCs. It is an ideal form of social engagement (Feenberg, 1989) and is often the best way to acquire knowledge (Davenport & Prusak, 2000). Although ACMC is considered the most popular medium for teaching and learning in OLCs, it is probably not the most effective means for online participants to connect. Some researchers raise the question of how OLCs can be developed without face-to-face contact between people. Although it is

possible to build online communities without it, face-to-face interaction is constructive and can be used to support community development (Palloff & Pratt, 1999).

As mentioned in the previous chapter (see Section 2.3), face-to-face meeting is usually found in online programmes as a way to support teaching and learning processes (Harasim et al., 2001). It serves particular purposes and offers online participants experiences that cannot be replaced by mediated communication. As Preece (2000) emphasises, "communicating via the Internet is no substitute for actual human interaction. A virtual hug, shown in the form of two parentheses—( ), is certainly not as warm, comfortable, and satisfying as a real hug. And sharing a nourishing, tasty meal is impossible in cyberspace" (p. 28). Early studies on distance education also refer to the importance of face-to-face interaction for learning. According to Holmberg (1986), face-to-face interaction can be useful for:

- Practising psychomotor skills in laboratories and under similar conditions; also verbal skills through personal communication;
- Facilitating the understanding of the communication process and human behaviour;
- Encouraging attitudes and habits of relevance for the study;
- Mutual inspiration and stimulation of fellow students;
- Training in co-operation (p. 53).

Holmberg (1986) also suggests that a combination of distance learning and face-to-face interaction, such as residential sessions, can create a pleasant atmosphere and help students deal with some difficulties derived from this mode of learning. A common format is to hold some form of residencies at the start of a programme for orientation and training. Other academic and social activities are also organised and allow students to participate in person (Harasim et al., 2001). In some cases, the sessions may be scheduled at intervals throughout the programme to provide some formal training and reinforce social connections among online participants. The sessions can be compulsory or optional depending on the purpose and necessity of each individual programme. Some programmes, such as online MBA, often require students to meet face-to-face several times during their studies because it is believed that personal interaction is essential. The session provides students with opportunities to meet faculty members and develop closer

contacts with other fellow students. However, many online programmes do not offer face-to-face sessions because of travelling costs and time constraints (Harasim et al., 2001).

3.6 Conclusion

The concept of OLCs is derived from the learning paradigm that highlights the importance of social interaction among participants in learning communities. This concept is claimed to be constructive by many researchers as social interaction among participants makes positive contributions to the learning process and outcomes. However, social interaction in OLCs is probably more fragile and difficult to maintain. Because OLCs are not restricted to physical locations, community members have to rely on communication media and connect to each other based on common goals, shared values, and involvement in joint activities. In this situation, people need to become more active in order to sustain a strong relationship and a sense of group cohesion.

Based on the literature, social factors, such as identity, trust, and personal relationships, are necessary in OLCs. They are considered important foundations of effective interaction online. Various techniques are proposed by many researchers to support the creation of these social factors in online environments. Yet, interaction in mediated contexts is still more challenging than that of face-to-face circumstances. Constraints can have negative impacts on effective social interaction and make the creation of social factors more problematic. Although advances in computer and communication technologies have linked people together, geographical separation is one of the major concerns for effective communication in OLCs. Synchronicity of time is perhaps another potential constraint that hinders OLC members in different time zones from interacting or collaborating at the same time. Apart from space and time, OLCs are likely to cross over cultures and languages. Clearly, they can introduce a very basic barrier that easily leads to communication difficulties and misunderstandings. From the literature, to reduce the constraints derived from online communication, face-to-face meeting is usually employed to support social interaction and learning in OLCs.

Although many researchers claim that social interaction is important and collaborative learning can be supported online, there is some evidence showing that reduced-cue environments provide a minimal degree of effective social interaction and

communication among online participants. This situation can adversely affect their learning motivation and active involvement in OLCs. To gain some more understanding and first-hand experience of the research context, a preliminary study was conducted in an online learning context. Four initial research assumptions derived from the literature are put forward and tested to see whether these assumptions are valid. The next chapter describes this in detail.

CHAPTER 4

Preliminary study

This chapter reports the results of the preliminary study designed to confirm an understanding of OLCs. Two surveys using online questionnaires are conducted in an online learning context to test the initial research assumptions derived from the literature. Statistical methods are used to analyse data from the surveys. Qualitative data from both surveys are also utilised in conjunction with the quantitative findings for further discussion.

4.1 Introduction

OLCs offer opportunities for positive impacts on learning to happen. In such contexts, meaningful knowledge co-construction and sharing can occur through dynamic social engagements among online participants, both students and tutors. Some social factors are claimed to provide support for effective online interaction and learning. Yet, constraints derived from communication in OLCs can probably make social interaction and the creation of such factors more problematic. Based on a review of the literature in the previous chapters, four initial research assumptions can be presented. They are:

- Social interaction has positive impacts on learning in OLCs;
- Social factors (i.e., identity, trust, and personal relationships) are important for social interaction in OLCs;
- Potential constraints (i.e., space, time, culture, and language) have negative impacts on social interaction in OLCs;
- Face-to-face interaction is important for social interaction in OLCs.

The aim of this preliminary study is to validate these assumptions in order to confirm an understanding and obtain a first-hand knowledge of OLCs in which social interaction plays an important role. Before the findings are presented and discussed, the unit of analysis and the methodology used in this study are described in the following sections.

4.2 Programme information

The Postgraduate Certificate in Health Economics for Health Care Professionals programme at the University of York is designed for those working in the health care sector wanting to gain an accredited qualification in health economics, but unable to study full-time. The programme aims to provide students[13] with the basic principles of health economics so that they can understand current situations from an economic perspective and apply the concepts to their work. This international postgraduate programme offers the flexibility to spread study over years to match professional and personal circumstances. It can be completed in a minimum of one year and a maximum of four years. The programme is based on four learning modules offered once a year. Each module, which lasts for approximately 12 weeks, comprises five or six individual study units. The first module starts in late September and other modules follow on consecutively every three months[14].

Each module is mainly based on a module workbook that contains the basic text for the module, exercises for both individual and group work, and references to additional reading. Brief information about each module is shown in Table 2 below.

Module	Descriptions
Module 1: Basic economic concepts	The module introduces the basic concepts of economics and why they are relevant to the study of health and health care. The module covers scarcity and choice, opportunity cost, average and marginal cost, supply and demand, consumer and producer surplus, different types of market, and decision making under uncertainty.
Module 2: Health economics: concepts and analysis	The module introduces the concepts, models, and methods that are used by health economists to analyse health care systems. Topics covered include the demand and supply of health care, provider reimbursement, and equity in health care provision.

[13] Students attending this programme are usually pharmacists, nurses, health economists, entrepreneurs, consultants, and those in the fields related to health and health care.

[14] Students must pass Module 1 before being allowed to take Module 2. They must pass Module 2 before being permitted to take Modules 3 and 4. However, Modules 3 and 4 need not be taken in that order.

Module 3: Introduction to health care evaluation	The module introduces the basic methods of clinical and economic evaluation and critical appraisals of published studies. Topics include the different types of clinical study (e.g., cohort study, case control study, randomised controlled clinical trial); forms of economic evaluation (e.g., cost-minimisation analysis, cost-effectiveness analysis, cost-utility analysis, cost-benefit analysis) and how to evaluate the strengths and weaknesses of studies and study design.
Module 4: The economics of health care systems	The module shows how the basic characteristics of the demand for/supply of health and health care influence the operation of different markets for health care, and the effects of proposed reforms in health care systems. Topics include the incentives created by different methods of funding health care; the advantages and disadvantages of different market structures in health care provision; the major features of the health care system in the UK and other countries, and the effects of proposed reforms of health care systems.

Table 2 Postgraduate certificate in health economics for health care professionals[15]

The programme is conducted online but usually supported by residential workshops in York. These face-to-face sessions offer a mix of seminars, lectures, and an opportunity to meet other colleagues and the programme team. Attendance at the first workshop at the beginning of the programme is compulsory while the remainder are optional. During the programme, most communication and collaboration among participants occurs online through ACMC, provided by the WebCT® learning platform. WebCT® is a web-based learning application that helped integrate a wide range of communicative tools, such as e-mail and computer conferencing, which support various types of student-tutor and student-student interaction. It also facilitated students' access to such additional online resources as electronic libraries services and online journals available for students on the programme. To the module tutors, WebCT® also helps distribute selected learning materials and provides administrative tools, such as controlled access to materials and online assignments.

In each module, students are divided into online discussion groups (around five or six students), each fully supported by module tutor(s) and the programme director using WebCT®. Students are not required to participate in online class discussions but are strongly encouraged to do so. The discussions are quite structured as pre-defined topics and exercises are provided in the module workbook. However, discussions between

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[15] Retrieved from http://www.york.ac.uk/res/herc/modules.htm (21 January 2005)

students and tutors, and among students themselves, on related topics can also be carried out. Because most students in this programme are professionals who have years of work experience in the field, the aim of online discussions is to create a vibrant learning environment that encourages the exchange of personal experiences and knowledge. During the study in each module, every student also needs to submit two or three pieces of assessed work based on the previous year's examination paper and an exercise in the workbook. The tutors will mark each assignment and send comments back to each individual student. The aim of these online assignments is to evaluate the level of understanding over the main topics of the module but they are not part of the module assessment.

Most tutors in this programme have previous experience of teaching health economics in online programmes. They also have informal training in online teaching and technical skills for the web based learning environment. In online discussions, they provide pedagogical advice on exercises and questions regarding the learning topics as well as general comments on the assessed work. They draw together some threads and summarise the discussions all the way through and at the end of study units. The role of module tutors also involves creating a supportive learning environment and promoting active student participation. General learning support (e.g. technical problems) is also provided by the programme director and the programme secretary throughout the programme. Students are required to attend a module assessment at the end of the module as part of their studies. The assessment involves an unseen written examination taken at an assessment centre. At present, centres are available in London, York, Bern, Cologne, Philadelphia, Tanzania, and Brazil. Students must score 40 percent or more in the examination before they are allowed to progress to the next module.

4.3 Methodology

4.3.1 Survey

The preliminary study was conducted with the students of the 2002 cohort in the Postgraduate Certificate in Health Economics for Health Care Professionals. The study covered the first module of the programme lasting approximately three months. It was designed primarily to gain a better knowledge of the research context using surveys. Two surveys using online questionnaires were carried out to collect data. Based on the

research assumptions (see Section 4.1), data were analysed statistically to investigate students' perceptions towards:

- Social interaction
- Social factors
- Potential constraints
- Face-to-face interaction

According to Kerlinger (1986), two major approaches of survey research are explanatory and exploratory surveys. The explanatory approach is used to explain causal relationships among variables while the exploratory method is used to provide basic familiarity with the subject. This preliminary stage of the research applied an exploratory survey to develop better knowledge of OLCs for further extensive investigation concerning social presence in such contexts. As noted by Babbie (1998, p. 90), an exploratory study is a way (1) to satisfy the researcher's curiosity and desire for better understanding, (2) to test the feasibility of undertaking a more extensive study, and (3) to develop the methods to be employed in any subsequent study. Two surveys—pre-module and post-module surveys—were conducted with a group of students in the programme. The pre-module survey was performed slightly before the first module started in September 2002. Three months later, after the module finished, the post-module survey was performed to compare the change in attitudes of online students in this programme. Both surveys used self-administered online questionnaires as the primary tool for data collection. The following section describes how the questionnaires were developed.

4.3.2 Instrumentation

The questionnaires were built on the theoretical framework derived from the literature review in Chapters 2 and 3. The pre-module questionnaire was composed of six sections using a combination of dichotomous close-ended questions and a variety of three-item Likert scales (see Appendix A). In each section, the participants were allowed to express their feelings and attitudes towards the subject under investigation. Their remarks were also used as qualitative data for further discussion. Because the sample size was small, this preliminary study applied a shorter scale in both questionnaires to obtain a

reasonable range of responses. However, a three-item scale can be sufficient to achieve a certain research objective (Jacoby & Matell, 1971).

The first section aimed to gain the contact details and some general information about the research participants. The second section aimed to obtain background information, such as confidence in using English as a communication medium, prior experience with technologies, and experience in online programmes. The third section was developed to acquire knowledge about the importance of social interaction in OLCs. The fourth section was designed to identify some social factors that can affect social interaction in OLCs, followed by the fifth section aiming to identify potential constraints, especially space, time, culture, and language in such contexts. The last section, finally, aimed to evaluate the significance of face-to-face interaction at the residential workshop for the learning process in asynchronous text-based environments. In order to observe how the attitudes changed, the questions in the post-module questionnaire (see Appendix D) were based on the three major sections of the first questionnaire—social interaction, social factors, and potential constraints in OLCs. However, because the workshop took place only once just before the first module started, the section concerning face-to-face interaction was not included in the follow-up questionnaire.

In questionnaire design, the first draft questionnaires were tested by two graduate students in Economic Studies. They were subsequently distributed and reviewed by various academic staff and experts to ensure the readability and suitability of the questions. To obtain more appropriateness, the questionnaires were tested again by actual students in a previous cohort of the programme. This pilot test is important, as it is a way of excluding unnecessary questions (De Vaus, 1996). The test data were then transferred to a statistical software package for a trial run, and the questions in both questionnaires were made more appropriate. The questionnaires were turned into an online version after the questions were reviewed and adjusted. This online version made it easier for the students to fill in the surveys and for the researcher to collect information in electronic format. Tests for the reliability and validity of the instruments were also conducted. The details are presented in the following sections.

4.3.3 Reliability

Generally, reliability is the extent to which a particular instrument or measure yields the same result when it is applied to the same object repeatedly (Carmines & Zeller, 1979). Reliability indicates how free the measure is from random error (Pallant, 2001). Unreliability can come from many sources. Poor wording or asking questions that people have no idea about, or have insufficient information about, can lead to "rough-and-ready answers" (De Vaus, 1996). According to De Vaus (1996), the best way to create reliability of indicators is to use a set of questions to measure a particular concept rather than single-item indicators.

When the measure is composed of a set of questions, Cronbach's coefficient alpha is probably the most common tool to calculate internal reliability (De Vaus, 1996). It provides an indication of the average correlation among all of the items or variables that make up the measure. The higher the figure, the more reliable the measure is. In this preliminary study, an internal reliability analysis for the survey instruments was conducted to ensure consistency of the scales. A Cronbach's alpha for internal reliability revealed an overall alpha coefficient of 0.78 for both surveys. The subscales' internal consistency values were also calculated and are presented in Table 3 below.

Scale	Pre-module survey		Post-module survey	
	No. of Items	Coefficient Alpha	No. of Items	Coefficient Alpha
Social interaction in OLCs	6	.72	6	.77
Social factors in OLCs	11	.58	14	.61
Constraints in OLCs	12	.75	12	.61
Face-to-face interaction in OLCs	4	.80	NA	NA

Table 3 Reliability scores for pre-module and post-module surveys

Generally, Cronbach's alpha value of 0.7 is considered adequate for internal reliability (Nunnally, 1978) although it can be lower with shorter scales (e.g., fewer than ten items).

4.3.4 Validity

Validity is generally regarded as a key issue in research design (Maxwell, 1996). It is defined as the extent to which a particular instrument (e.g., questionnaire) measures what it is designed to measure (Babbie, 1998; Frankfort-Nachmias & Nachmias, 1996).

Carmines and Zeller (1979) define three basic types of validity—construct validity, content validity, and predictive validity. Construct validity concerns the extent to which a given instrument is consistent with theoretically derived hypotheses regarding the concept being measured (Carmines & Zeller, 1979). Content validity refers to how much an instrument provides an adequate representation of the meaning and concept of a particular domain (Nunnally, 1978). Predictive validity, finally, focuses on the relations between a given instrument and a predicted outcome regarded as an external criterion.

Applying the concept of predictive validity can be problematic because there is no established criterion against which an instrument can be used to compare, especially in new research areas (Babbie, 1998; De Vaus, 1996). Therefore, the researcher attempted to achieve construct validity and content validity in this preliminary study. In the study, the researcher first reviewed the literature and theories that could serve as a foundation for the questionnaires. The theoretical framework (related to online learning contexts in which social interaction, social factors, and constraints play an important part) was investigated hoping to come to an understanding of the contexts. Then a set of items intended to reflect the important content of a given theoretical framework was formulated.

Although the researcher attempted to obtain a reasonable level of the adequacy of the content that was sampled, the process was quite complex and difficult because the notion of OLCs involved various abstract concepts (e.g., identity and trust), typically found in the social sciences (Carmines & Zeller, 1979). Having said that, content validity is useful in the exploratory research, like this preliminary study, where the researcher constructs the instrument and employs it for the first time. Subsequently, its validity may possibly be compared with that of the other instruments (Frankfort-Nachmias & Nachmias, 1996).

4.3.5 Procedures

Before the pre-module survey began in September 2002, the researcher attended the residential workshop arranged just before the first module started. Attending the session with the students offered three major advantages. First, the session was a great opportunity to provide students with better understanding of the nature of the research and the reasons underlying the survey. Second, it was a good chance to meet students and become familiar with them for future research stages. Finally, the workshop

provided an opportunity to have an informal discussion with some students to gain some ideas about their concerns and expectations from an online course.

Participants completed the first survey online during the workshop. Once the participants submitted their questionnaires, data were sent electronically to the server. Then they were transferred into a statistical software package ready to be analysed in the next stage. To gain a better understanding, different statistical analysis techniques were conducted. Descriptive statistics were calculated to acquire general ideas about students' perceptions towards social interaction, social factors, potential constraints, and face-to-face interaction. Since some of the participants had prior experience of online education, the Mann-Whitney U test was performed to compare the rank sums between experienced and non-experienced groups.

The follow-up survey was also conducted online after the first module was completed in December 2002. The data obtained from this survey were processed using descriptive statistics. The Wilcoxon Signed Rank test was also calculated to see whether students' perceptions in both surveys were statistically different. Finally, the comments given by students at the end of each section of the questionnaire were also used to support the quantitative findings. Equipped with these comments, the researcher gained a better understanding of OLCs and recognised some important factors that contribute to successful online interaction in the OLC building process.

4.4 Survey findings

This section reports the quantitative findings of the preliminary study. Based on the research questions mentioned earlier, this section is composed of four sub-sections: social interaction, social factors, potential constraints, and face-to-face interaction in OLCs. Each sub-section of the findings reports the results from the first survey (see Appendix A) and the Mann-Whitney U test that compares the differences in attitudes between two groups of students categorised by their prior online experience. Subsequently, the results from the second survey (see Appendix D) and the Wilcoxon Signed Rank test are reported to see the changes in students' attitudes between the two surveys.

4.4.1 Demographics

Sixteen responses (100%) were received from the first survey and 13 responses (81.3%) were received from the second survey. The sample size of the second survey was slightly smaller because it was a self-administered online survey conducted remotely. In addition, it was performed close to the time when the module examination took place. Of the 16 students enrolled on the programme, ten were female and six were male, with an average age of 35 years ranging from 26 to 50. Nearly all of them were Caucasian while only one was African. Students studied in different locations but were mostly in Europe. All of them were in health care, health economics, and related fields. Fifteen worked full-time while only one worked part-time. Eight students were native English speakers. Yet, the other students who were non-native English speakers still expressed their confidence in the use of English as a medium. No one expressed any concern about using English to communicate with other class members.

As far as the use of computers and computer applications was concerned, although their skills might vary, all students used personal computers and computer applications (e.g., e-mail, word processors, spreadsheets, and web browsers) quite often. Thirteen students normally used computers and the Internet at both home and the workplace while the rest commonly used these facilities only at their workplace. Regarding the experience in online programmes, only three students had prior experience in some sort of online learning before attending the programme.

4.4.2 Social interaction

According to the literature (see Section 3.2), social interaction is constructive and must be supported to reduce the constraints originating from learning in asynchronous text-based environments. This part of the survey was designed to confirm this assumption and gain some insights into students' attitudes towards social interaction in such contexts. The findings from the first survey showed that students in this programme were very positive about social interaction. Most students believed that online interaction with other class members would provide them with a constructive learning experience. In particular, they thought that interaction would reduce the feelings of isolation, make them more enthusiastic, help them gain new knowledge, and create a sense of belonging to the class (see Appendix A). The Mann-Whitney U test also showed no significant

differences in the attitudes between students with and without previous online learning experience (Table 4).

Variables	Pre-module survey (N=16)		Post-module survey (N=13)	
	Mann-Whitney U Test		Wilcoxon Signed Rank Test	
	Z	Exact Sig. [2*(1-tailed Sig.)]	Z	Exact Sig. [2*(1-tailed Sig.)]
Social interaction in OLCs				
Interaction reduces social isolation	.000	1.000	-.632	.527
Interaction makes one feel more enthusiastic	-.894	.611	-.447	.655
Interaction helps gain new knowledge	-.480	.900	-.447	1.000
Participation helps develop relationships	-.237	.900	-1.299	.194
Participation helps create a sense of belonging	-.889	.611	-.966	.334
Interaction offers positive learning experiences	-.703	.704	-.577	.564

Note:
Mann-Whitney U Test compares the difference in attitudes between students with prior online experience and students without prior online experience.
Wilcoxon Signed Rank Test compares the difference in attitudes between students in the pre-survey and the post-survey.
$p<.05$

Table 4 Social interaction in OLCs

Similarly, the follow-up survey also revealed the positive attitudes of online students towards social interaction in an online community (see Appendix D). The Wilcoxon Signed Rank test, conducted to observe the differences between the pre- and post-module surveys, showed no significant differences in their attitudes (Table 4). The findings from both surveys confirmed the notion that social interaction among online participants has positive impacts on students' learning process.

4.4.3 Social factors

Based on the literature (see Section 3.3), social factors, such as identity, trust, and personal relationships, act as a precondition for effective social interaction in OLCs. They play an important part in helping people work enthusiastically as community members, and thus increasing a sense of belonging and the social cohesion of the community. The aim of this section is to confirm this idea and investigate whether the online situation makes these factors more difficult to establish.

4.4.3.1 Identity

The literature shows that identity needs to be created in OLCs because it helps online participants create an initial form of trust and personal relationships. From the first

survey, most students believed that knowing others' identities was important for social interaction in an online environment. However, they believed that it was more difficult to establish identity online, and this process would probably take more time compared to the face-to-face situation (see Appendix A). The Mann-Whitney U test showed significant differences between experienced and non-experienced students concerning the impact of distance towards identity formation (Table 5). Every student who believed that distance made identity more difficult to establish had no previous experience of online class. In contrast, every student with such an experience did not believe it (see Appendix C).

Variables	Pre-module survey (N=16)		Post-module survey (N=13)	
	Mann-Whitney U Test		Wilcoxon Signed Rank Test	
	Z	Exact Sig. [2*(1-tailed Sig.)]	Z	Exact Sig. [2*(1-tailed Sig.)]
Social factors in OLCs				
1. Identity				
Knowing others' identity is important for online interaction	-.528	.704	-1.475	.140
Distance makes identity more difficult to establish	**-2.602**	**.025**	**-2.060**	**.039**
Identity takes time to establish online	-1.760	.111	-1.035	.301

Note:
Mann-Whitney U Test compares the difference in attitudes between students with prior online experience and students without prior online experience.
Wilcoxon Signed Rank Test compares the difference in attitudes between students in the pre-survey and the post-survey.
p<.05

Table 5 Identity in OLCs

Based on the results of the follow-up survey conducted at the end of the first module, most students confirmed that identity was important for online interaction although the creation of identity online took longer than that of face-to-face communication. What was different from the previous survey was that most students in this survey agreed that establishing identity over a distance was not difficult. More than half of the students in this post-module stage admitted that they had developed an identity in this online class (see Appendix D). The Wilcoxon Signed Rank test confirmed the findings by showing significant differences in these students' attitudes between the two surveys (Table 5).

4.4.3.2 Trust

Apart from identity, trust is another social factor that needs to be created in OLCs. Based on the literature, the formation of online trust is difficult and challenging. However, the

majority of students in the first survey believed that trust was important for online interaction and could be established in such environments. Although they agreed that online trust would take more time to create, distance would not make the creation process more difficult (see Appendix A). No significant differences were found between experienced and non-experienced groups concerning trust in OLCs (Table 6).

Variables	Pre-module survey (N=16) Mann-Whitney U Test		Post-module survey (N=13) Wilcoxon Signed Rank Test	
	Z	Exact Sig. [2*(1-tailed Sig.)]	Z	Exact Sig. [2*(1-tailed Sig.)]
Social factors in OLCs				
2. Trust				
Trust is important for online interaction	-1.958	.082	-.587	.557
Trust can be established online	-.894	.611	-1.613	.107
Distance makes trust more difficult to establish	-1.587	.189	-1.265	.206
Trust takes time to establish online	-1.080	.364	-1.387	.165

Note:
Mann-Whitney U Test compares the difference in attitudes between students with prior online experience and students without prior online experience.
Wilcoxon Signed Rank Test compares the difference in attitudes between students in the pre-survey and the post-survey.
p<.05

Table 6 Trust in OLCs

Similar findings were also found in the follow-up survey (Table 6). The majority of the students confirmed the importance of trust for social interaction in OLCs. It could be established among online participants without any constraint from geographical separation. Although most of them agreed that trust required some time to create in online environments, they admitted that they had developed some form of trust with other participants in this class (see Appendix D).

4.4.3.3 Personal relationships

Apart from identity and trust, social interaction in OLCs needs a good relationship among participants to develop cohesive communication and reduce personal conflicts. According to the literature, long distance relationships can be difficult to develop and maintain. However, most students in the pre-module survey believed that personal relationships were important for social interaction and could be established in online settings. They also believed that geographical separation would not make personal relationship development more difficult (see Appendix A). No significant differences in

attitudes were found between experienced and non-experienced groups concerning personal relationships in online environments (Table 7).

Variables	Pre-module survey (N=16)		Post-module survey (N=13)	
	Mann-Whitney U Test		Wilcoxon Signed Rank Test	
	Z	Exact Sig. [2*(1-tailed Sig.)]	Z	Exact Sig. [2*(1-tailed Sig.)]
Social factors in OLCs				
3. Personal relationships				
Personal relationships are important for online interaction	-1.587	.189	-.730	.465
Personal relationships can be established online	-1.066	.439	-.333	.739
Distance makes personal relationships more difficult to establish	-1.576	.189	-1.155	.248
Personal relationships take time to establish online	-1.234	.364	-.707	.480

Note:
Mann-Whitney U Test compares the difference in attitudes between students with prior online experience and students without prior online experience.
Wilcoxon Signed Rank Test compares the difference in attitudes between students in the pre-survey and the post-survey.
$p<.05$

Table 7 Personal relationships in OLCs

The findings showed no significant differences between the two surveys concerning personal relationships in OLCs (Table 7). Similarly, most students in the post-module survey confirmed that personal relationships were important. They agreed that personal relationships could be established in an online setting and geographical distance did not make it more difficult for them to do so. Although they admitted that this social factor required more time to establish in online contexts, they had developed a personal relationship with other participants in this class (see Appendix D).

4.4.4 Potential constraints

While building collaborative OLCs is a constructive idea, making it happen is not easy. The literature (see Section 3.4) shows that constraints in OLCs are placed on the way people collaborate, as they have to cope with not only space, but also time, culture, and language differences. This section of the preliminary study aims to find out whether these constraints affect effective social interaction and learning in such environments.

4.4.4.1 Space constraints

The literature on geographical separation shows that the absence of face-to-face interaction in online communication can lead to a negative learning experience. Most

students in the pre-module survey believed that learning over a distance would be lonely and resulted in fewer interactions with other class members. However, they did not believe that geographical distance would make them less motivated in learning (see Appendix A). The Mann-Whitney U test showed significant differences between experienced and non-experienced groups about the feeling of isolation in online learning (Table 8). Every student who believed that learning over a distance would be lonely had no previous experience in an online class. In contrast, no student with such experience believed this (see Appendix C).

Variables	Pre-module survey (N=16)		Post-module survey (N=13)	
	Mann-Whitney U Test		Wilcoxon Signed Rank Test	
	Z	Exact Sig. [2*(1-tailed Sig.)]	Z	Exact Sig. [2*(1-tailed Sig.)]
Constraints in OLCs				
1. Space constraints				
Online learning is lonely	**-2.591**	**.007**	**-1.994**	**.046**
Online learning results in fewer interactions	-1.091	.364	-.347	.729
Online learning is less motivating	-1.587	.189	-.520	.603

Note:
Mann-Whitney U Test compares the difference in attitudes between students with prior online experience and students without prior online experience.
Wilcoxon Signed Rank Test compares the difference in attitudes between students in the pre-survey and the post-survey.
p<.05

Table 8 Space constraints in OLCs

Significant differences between the two surveys were found in terms of the attitude towards social isolation in online environments (Table 8). In contrast to the first survey, most students who now had direct experience from the first module disagreed that learning over a distance was lonely. However, although they agreed that learning in such environments resulted in fewer interactions with other class members, geographical separation did not make them less motivated in learning (see Appendix D).

4.4.4.2 Time constraints

Like geographical separation, differences in time zones can potentially affect how people communicate online. Most students in the pre-module survey believed that time differences would make real-time collaboration more difficult. However, there was no strong evidence concerning the impact of time differences on students' motivation (see Appendix A). The Mann-Whitney U test showed significant differences in the attitudes between experienced and non-experienced groups concerning difficulties in real-time

collaboration across time zones (Table 9). Students who believed that time differences would make online collaboration more difficult did not have prior experience in online learning while those with such an experience were more neutral about this (see Appendix C).

Variables	Pre-module survey (N=16)		Post-module survey (N=13)	
	Mann-Whitney U Test		Wilcoxon Signed Rank Test	
	Z	Exact Sig. [2*(1-tailed Sig.)]	Z	Exact Sig. [2*(1-tailed Sig.)]
Constraints in OLCs				
2. Time constraints				
Time differences make it difficult for real-time collaboration	**-2.481**	**.039**	**-2.581**	**.010**
Time differences are less motivating for real-time collaboration	-.430	.704	-1.730	.084

Note:
Mann-Whitney U Test compares the difference in attitudes between students with prior online experience and students without prior online experience.
Wilcoxon Signed Rank Test compares the difference in attitudes between students in the pre-survey and the post-survey.
p<.05

Table 9 Time constraints in OLCs

In contrast, most students in the follow-up survey disagreed that time differences made it more difficult for them to collaborate synchronously with other participants. The Wilcoxon Signed Rank test confirmed the change in this attitude between students in the two surveys (Table 9). Although not statistically significant, more students in this survey disagreed that different time zones negatively affected their motivation in real-time collaboration (see Appendix D).

4.4.4.3 Cultural differences

The literature concerning cross-cultural communication claims that interaction in OLCs may involve cultural differences leading to communication difficulties and misunderstanding. However, based on the first survey results, most students did not believe that cultural differences would cause any negative impact on learning in such contexts (see Appendix A). No significant differences in attitudes between experienced and non-experienced groups concerning cultural differences were found (Table 10).

Variables	Pre-module survey (N=16)		Post-module survey (N=13)	
	Mann-Whitney U Test		Wilcoxon Signed Rank Test	
	Z	Exact Sig. [2*(1-tailed Sig.)]	Z	Exact Sig. [2*(1-tailed Sig.)]
Constraints in OLCs				
3. Cultural differences				
Cultural differences make it difficult to understand each other	-.946	.439	-.108	.914
Cultural differences make it difficult to collaborate online	-1.240	.364	-.816	.414
Cultural differences make it difficult to establish trust	-.703	.704	.000	1.000
Cultural differences make it difficult to establish personal relationships	-.702	.704	.000	1.000

Note:
Mann-Whitney U Test compares the difference in attitudes between students with prior online experience and students without prior online experience.
Wilcoxon Signed Rank Test compares the difference in attitudes between students in the pre-survey and the post-survey.
$p<.05$

Table 10 Cultural differences in OLCs

Similarly, most students in the follow-up survey disagreed that cultural differences caused negative impacts on their learning in OLCs (see Appendix D). The Wilcoxon Signed Rank test showed no significant differences in the attitudes between students in the two surveys (Table 10).

4.4.4.4 Language differences

The literature shows that language can cause communication problems in OLCs where members may come from different places and use different languages. However, the findings revealed that most students in the first survey did not believe that language differences would cause adverse effects on online learning (see Appendix A). The Mann-Whitney U test also showed no significant differences between experienced and non-experienced groups (Table 11).

Variables	Pre-module survey (N=16)		Post-module survey (N=13)	
	Mann-Whitney U Test		Wilcoxon Signed Rank Test	
	Z	Exact Sig. [2*(1-tailed Sig.)]	Z	Exact Sig. [2*(1-tailed Sig.)]
Constraints in OLCs				
4. Language differences				
Language differences make it difficult to understand each other	-.807	.521	-.513	.608
Language differences make it difficult to collaborate online	-.741	.521	-.973	.331
Language differences make knowledge sharing less effective	-.459	.704	-1.318	.187

Note:
Mann-Whitney U Test compares the difference in attitudes between students with prior online experience and students without prior online experience.
Wilcoxon Signed Rank Test compares the difference in attitudes between students in the pre-survey and the post-survey.
$p<.05$

Table 11 Language differences in OLCs

The post-module survey showed no strong evidence that language differences made online learning problematic. The majority of students were rather neutral regarding the negative impact of language differences towards online learning (see Appendix D). No significant differences in students' attitudes between the two surveys were found (Table 11).

4.4.5 Face-to-face interaction

As mentioned previously (see Sections 2.3 and 3.5), combining a face-to-face interaction in an online course is a strategy frequently used to support learning activities in OLCs. Face-to-face contacts help "break the ice" at the beginning stage of community development and provide an opportunity for a meaningful dialogue to happen. This section describes students' attitudes towards face-to-face interaction at the residential workshop arranged before the first module started, as well as its impact on the learning process in an asynchronous text-based environment.

Variables	Pre-module survey (N=16)		Post-module survey (N=13)	
	Mann-Whitney U Test		Wilcoxon Signed Rank Test	
	Z	Exact Sig. [2*(1-tailed Sig.)]	Z	Exact Sig. [2*(1-tailed Sig.)]
Face-to-face interaction in OLCs Ψ				
Face-to-face contact at the workshop is important for online collaboration	.000	1.000	NA	NA
The groupwork sessions help form a personal relationship	-.741	.521	NA	NA
The groupwork sessions help establish trust	.000	1.000	NA	NA
The workshop provides more confidence for future online discussions	-.237	.900	NA	NA

Note:
Mann-Whitney U Test compares the difference in attitudes between students with prior online experience and students without prior online experience.
Ψ This part was not included in the post-module survey.
p<.05

Table 12 Face-to-face interaction in OLCs

Based on the findings from the pre-module survey, students had quite positive attitudes towards the workshop. All students agreed that the workshop provided a good opportunity for face-to-face contacts with other participants. Most of them also agreed that the workshop helped form personal relationships, establish mutual trust, and provide more confidence for future online discussions (see Appendix A). Both experienced and non-experienced students were optimistic about face-to-face meetings at the workshop. No significant differences between the two groups were found (Table 12).

4.5 Qualitative data

This section reports the qualitative data derived from the comments made by students in the post-module survey. These comments reflected students' attitudes towards various aspects of OLCs (e.g., social factors and constraints) based on their experience from the first module. The comments were also expected to substantiate the survey results reported in the previous section and to provide a better understanding of learning in asynchronous text-based environments in general.

As far as social interaction was concerned, the results from both surveys supported the idea that social interaction in OLCs is constructive and should be encouraged in such environments. Social interaction in learning communities can serve to reduce loneliness and increase the chance that students stay involved and motivated in the learning process (Palloff & Pratt, 2001). Based on the findings in this preliminary study, students' attitudes towards social interaction in OLCs were very positive. Although many of them

were non-native English speakers and did not have prior experience in any online learning, they believed that online interaction reduced the feelings of social isolation, encouraged more enthusiasm, helped acquire new knowledge, and provided a positive learning experience. In fact, asynchronous text-based environments allowed students to learn and communicate as effectively as, if not more than, in traditional face-to-face classrooms. One student positively mentioned this type of learning after the first module finished.

> *I am enjoying distance learning... the benefits need to include the fact that you work while you learn... or rather you bring up your children while you learn.... I have also been surprised at the intensity of the supervision. It is spot on and frequent... something, which would have been impossible under a normal classroom situation. Also one does not feel shy to ask even silly questions....*

As mentioned earlier, social factors, such as identity, trust, and personal relationships, are important foundations of social interaction and collaboration in such contexts. Although it has been argued that such constraints as geographical separation can hinder the formation of these factors, the findings from this study suggested otherwise. In both surveys, most students admitted that identity was important for online collaboration. Although many of them agreed that it took more time compared to a face-to-face situation, they had developed identity with other participants in this class. However, creating an online identity may need an active contribution to the community, especially at the beginning stage of community development. As one student stated:

> *I have developed identity with those people actively participating and with tutors.*

In fact, identity is a basic building block of social interaction. The disclosure of identity, at both personal and social levels, not only helps members in OLCs to recognise each other, but also allows them to collaborate and exchange their knowledge more efficiently. It is obvious that the workshop was a good starting place to create identity as students had an opportunity to meet face-to-face. The following remark expressed by a student in this study supported this idea.

> *We did all meet during the first workshop and I think that is where identities were established. It is difficult to imagine*

> *how the online communication would go if we have not met in real life before.*

Apart from identity, trust should be established to support effective communication and knowledge sharing in OLCs. In essence, trust and identity are closely interrelated. To trust someone, people need to know more than just basic information. Based on the findings, most students agreed that trust was important for online interaction. Although they needed some time to establish trust in an online context, the findings showed that geographical distance did not make it more difficult for them to do so. According to Wenger (1998), trust can be formed in the coalescing stage of community development when people get to know each other, have enough common ground to feel connected, and see the value of sharing their knowledge. After the first module, the majority of the students admitted that that they had developed some form of trust with other class members. Supported by face-to-face interaction at the beginning of the programme and the shared repertoire developed during online discussion processes, students were able to develop trust that helped them collaborate successfully in asynchronous text-based OLCs.

When considering personal relationships, most students in this study believed that they were important. As with identity and trust, most of them admitted that they needed some time to establish personal relationships in an online context. However, geographical separation among online members did not seem to be a constraint for relationship development. The residential workshop that allowed students to contact face-to-face also helped them form an initial stage of personal relationship development. Moreover, the personal web page provided by WebCT® also enhanced and maintained these processes among online participants after the workshop. By sharing personal information, academic background, and professional experiences, online participants were allowed to learn more about tutors and other class members and developed stronger personal relationships (Muirhead, 2002).

Based on the literature in the previous chapter, some constraints intrinsically derived from the characteristics of OLCs were found and potentially affected learning in such contexts. Geographical separation, for instance, can demotivate students during their online learning process (Schuemer, 1993). However, there was no obvious evidence from the surveys showing that learning in an online space was lonely or made them less

motivated although they admitted that geographical separation resulted in fewer interactions with other class members. According to the survey findings, students in the pre-module stage believed that learning over a distance was lonely but this was not the case when they finished the first module. Here, active interaction among participants during the programme helped alleviate the degree of social isolation and encouraged the learning motivation of the distance learners. As a student stated:

> *I feel social interaction can reduce academic/learning isolation.*

In fact, online learning is not for everyone. It is designed for a certain type of learner, usually adults, who select this method to fit their learning styles and personal requirements (Moore & Kearsley, 1996). Consequently, geographical separation in online education is not always a threat but an opportunity for such people to gain new knowledge without sacrificing major responsibilities. The findings from this study showed that most students had a strong motivation to continue their studies regardless of such constraints as space and time.

Concerning the time differences, no strong evidence was found that different time zones made it more difficult for online participants to collaborate synchronously. Actually, most of the students were living in the United Kingdom (UK) and the European Union (EU). Only four students needed to work with other class members across time zones. However, two of these did not have any negative effect from time differences because they were only an hour away from other group members. A student who worked in a different continent did not seem to have this concern. As she noted:

> *I participated [in class discussions] with a 5-hour time difference and had no problems.*

However, another student who also needed to communicate with other group members across time zones revealed a different story. Although ACMC seemed to support communication and social interaction effectively in online learning contexts, time differences can still create some frustrations. As this student expressed it:

> *Time zones... the turn over rate to get a reply is a little frustrating. I still have not had a good reason to go beyond the bulletin board and private mail....*

Although some students in this preliminary study seemed to have a slight problem with space and time constraints, the results of both surveys did not show any concern about cultural differences. Almost all students were Europeans who had no major differences in cultural backgrounds. With quite similar culture, though varied in details, they did not find that cultural issues made it more difficult for them to understand and collaborate with other participants. In fact, cultural differences do not always lead to a negative online learning experience. Based on the findings, they could also provide a positive learning outcome to online students. As one of the students commented:

> *The fact that other participants come from different backgrounds adds to my learning experience.*

Another student also admitted:

> *Cultural differences enrich the learning experience.*

Similarly, both survey results suggested that students in this study did not believe that language was a constraint on their learning and social interaction in an online context. Although half of them were non-native English speakers, they were quite confident in the use of English as a communication medium. Communication in asynchronous text-based environments seemed to lessen the concerns over language differences. The asynchronicity of ACMC supported online students who were non-native English speakers to communicate more effectively. They could spend more time to reflect on the learning topics, access some learning resources, and compose their messages before contributing to the discussion (Harasim et al., 2001). While language differences did not lead to a serious negative learning experience for most students in this class, some of them still believed that language differences made their learning process in an online context more difficult. A student in the following example expressed a slight problem with communicating in English because she did not use English on a daily basis.

> *I am working in my mother tongue so I have a few difficulties.*

Another student admitted:

> *In general, I would agree with all of these [in that language differences make it more difficult for people in an online class to understand each other, to collaborate, and share their knowledge]. However, in our little group of six, all do very well in English. So there is no problem.*

Concerning face-to-face interaction in OLCs, most students were very optimistic about the residential workshop. Both formal and informal activities, such as groupwork sessions and the dinner, provided them with good opportunities to socialise, collaborate, and gain new ideas from various perspectives. As remarked by an online student:

> *I think on the whole the workshop was extremely useful. It obviously gave the opportunity to meet other members of the group i.e., tutors and students. It shed light on what the course objectives were and what was expected of students in a very explicit way.*

Face-to-face contacts also played an important part in online identity- and trust-building processes. As one student noted:

> *Again, I have developed some forms of trust only because I have met these people face-to-face in the workshop and after the exam in London.*

It helped online participants develop an initial stage of personal relationships, which was very important for future collaboration and knowledge sharing in an online class. The following message refers to the importance of face-to-face interaction in establishing a pleasant relationship among online participants, as well as a positive impact of a good relationship in online learning.

> *Considering the fact that the programme is long distance, individuals in various groups should be strongly encouraged to strike a cordial relationship with each other before leaving [the workshop]. This might encourage more effective group discussions.*

The study suggested that face-to-face meeting is considered an important aspect of learning activities in OLCs. It can take place just before online activities start to help form identity, trust, and personal relationships. In many cases, it can be used as a

strategy to reinforce group cohesion and stimulate active social interaction among online members during an extended online learning process.

4.6 Conclusion

The conclusion drawn from this chapter was based on the preliminary study to confirm an understanding and gain a direct experience about OLCs. Only a small sample was studied and there were limitations as to how far these findings could be generalised. However, grounded in the research findings from both surveys, it is possible to confirm some of the initial research assumptions mentioned earlier. The findings showed that social interaction among online participants was important and had positive impacts on learning in OLCs. It helped reduce social isolation originating from the lack of physical contact and encouraged learning motivation in such contexts. Social sharing in such contexts allowed participants to gain new knowledge and develop a sense of community, which in turn resulted in both affective and cognitive learning.

Based on the survey results, identity, trust, and personal relationships were regarded as key foundations of social interaction in OLCs. The findings confirmed the initial assumption that social factors are important for online collaboration. These factors can also be established among online members without limitations imposed by distance although more time is required compared to face-to-face situations. Previous research studies (e.g., Walther, 1992) report a similar finding that social communication and personal relationship development is possible, but the process simply takes longer online. Although creating social factors online is claimed by many researchers to be difficult and challenging, the results of this study suggest otherwise. People can be completely anonymous to each other online but this is not the case in OLCs. OLCs are usually found in formal educational contexts where members are introduced to each other. They may have some common ground and possibly have face-to-face contact before online discussions begin. These processes make social factors easier to establish among participants.

However, this study revealed that constraints, such as space, time, culture, and language, were not major obstacles for online participants. Distance and time could cause fewer interactions, but a strong feeling of social isolation was not found. Because most students were in the UK and the EU, these limitations were not a main concern for them. The

study also showed that space and time did not make online students less motivated. This was probably because students in this class were mature and highly motivated, as is usually found in a typical online class (Moore & Kearsley, 1996). Similarly, other constraints, such as cultural differences, did not have negative impacts but allowed students to learn from various perspectives. Neither did language differences have a significant impact because most non-native students were capable of using English. The impacts could possibly be minimised by the use of a learning technology, such as ACMC that allowed students to spend more time reflecting and composing their messages. However, these findings should be interpreted carefully. Although the findings regarding these constraints were of little concern in this study, they could become a potential issue if the learning took place globally or entirely online. Finally, face-to-face interaction proved important for learning in OLCs. Students considered face-to-face meetings, such as group sessions at the workshop, essential for their online collaboration. The workshop acted as a starting point where online participants introduced themselves and created their own identities. It also helped them form an initial stage of trust and personal relationships, which were important for later discussions and knowledge sharing in online settings.

At this point, a better understanding of learning communities in asynchronous text-based environments was achieved. The results from this study suggested that collaborative learning in such contexts was possible through social interaction among online participants. ACMC as the major communication tool also had a potential to provide support for dynamic interaction to occur. However, some researchers argue that active interaction does not always guarantee that a positive online learning experience will occur. They propose that a key element that helps promote active and constructive interaction, and is closely linked to the social factors mentioned earlier, is a feeling of social presence. The concept of social presence is also claimed to have positive impacts on the learning process and outcomes in such contexts. The literature on social presence is described further in the next chapter.

CHAPTER 5

Social presence in OLCs

This chapter provides a general background and defines the concept of social presence in OLCs. It starts with the theoretical frameworks of social presence studies. Some related theories are also described to provide an understanding of social communication through ACMC. The classifications of social presence definitions are explained to provide the necessary conceptual clarity and the focus of this research. The literature on social presence and learning in both traditional and online classes is also presented. Finally, social presence measurement and the tools applied to previous research studies are also discussed.

5.1 Introduction

From the literature, social interaction plays a central role in the learning process. However, social interaction among participants in OLCs usually takes place across space and time, and probably culture and language. People tend to have only a few face-to-face contacts and rely mostly on some media, which cannot substitute for an actual face-to-face interaction (Preece, 2000; Wenger et al., 2002). Online communication using a low-bandwidth medium, such as ACMC, may also lack the contextual cues necessary to understand social discourse and reduce the extent of the communication that occurs (Preece, 2000). Compared to face-to-face situations, mediated communication through ACMC is frequently considered more task-oriented, less emotional, and less personal (Hiltz, Johnson, & Turoff, 1986). The transition from conventional learning communities to OLCs may raise the question of whether it is possible to make the online learning process sociable and interactive.

However, the results of the preliminary study suggested that collaborative learning in OLCs could happen among online participants. Social interaction proved its importance in providing a positive online learning experience while a lean medium, such as ACMC, seemed to have a potential to support active interaction in such contexts. Having said

that, social interaction itself is not enough for constructive teaching and learning processes in OLCs. As Woods and Baker (2004) note, "although increased interaction among participants may lead to more opportunities for positive social penetration, it may also lead to competition, "flaming," and other forms of negative communication". Some researchers (e.g., Anderson, 2004; Woods & Baker, 2004) argue that social presence must be established to create a learning environment that provides the necessary degree of comfort and safety to express their ideas. The literature suggests that social presence among online members is considered a meta-theory to describe active and constructive social interaction in online learning. According to Tu and McIsaac (2002b), social presence increases and positively influences online social interaction while the frequency of online interaction does not necessarily represent a high level of social presence.

Social presence also plays an important part in the OLC building process. Tu and Corry (2002) assert that "social presence is required to ensure the online interaction necessary to sustain community activity….To foster an ideal online learning community, one should increase and idealize the level of social presence". Moreover, it could be assumed from the preliminary study that a sense of presence helps facilitate the creation of such social factors as identity, trust, and personal relationships, which are the foundations of social interaction. This could also explain why face-to-face interaction is used to support the learning process in OLCs, where contextual cues are missing. One of the major goals of a personal meeting at the workshop is to create an opportunity for online participants to socialise and confirm their presence, which is important and useful for future collaboration.

Although many research findings suggest that social presence can be created in OLCs, "how" such a feeling is developed needs further investigation. As Swan (2002) emphasises, "how social presence develops in online discourse is… fertile ground for further research" (p. 26). While social presence is a vital factor for online learning, the infancy of the field itself, as well as some research gaps (e.g., short-term studies) mentioned earlier, results in a lack of a comprehensive understanding of how social presence is developed in these settings. This leads to the following central question of the research:

How does social presence develop in asynchronous text-based OLCs and what are its effects on learning in such environments?

To answer this research question, an extensive study of social presence in educational settings is required. Chapters 7 and 8 provide the results of a longitudinal study giving a better understanding of social presence development and its relationship with learning in an online context. However, it is necessary to begin this chapter with a review of the literature in this area to provide a general background of social presence. Therefore, the theoretical frameworks of social presence is first described in order to give an idea how the concept has evolved from a traditional view to a more recent perspective and from communication research to education domain. Social presence classifications and measurement tools are also reviewed later on in this chapter.

5.2 Theoretical frameworks

Early studies of social presence were rooted in telecommunication research, which focuses on the ability of communication media to convey social and emotional cues using face-to-face contact as the benchmark. This traditional cues-filtered-out approach (Culnan & Markus, 1987), or what Spears and Lea (1992) called the "social cues perspective", proposes that mediated communication is devoid of social context. The lack of cues in ACMC situations (e.g., eye contact, facial expression, voice intonation, bodily movement, physical appearance) makes communication impersonal and low in social presence. Some influential theories categorised in this approach are described in Section 5.2.1. As opposed to the cues-filtered-out approach, the relational approach (Walther, 1992) argues that ACMC can convey social information and that ACMC users will adapt their textual and linguistic behaviours to compensate for the lack of social and nonverbal cues. Consequently, the notions that ACMC contexts are unfriendly and social presence is minimal in such contexts have changed. Two theories categorised in this approach, the social information processing model and the equilibrium model, are described in Section 5.2.3.

5.2.1 Cues-filtered-out approach

5.2.1.1 Social presence model

The concept of social presence was first introduced by Short et al. (1976) as "the degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships" (p. 65). According to them, social presence is based on the capacity of media to convey psychological proximity in mediated communication. They

suggest that communication media vary in the number of communication channels and the degree of social presence (Short et al., 1976). In their study, they compared different types of media—face-to-face, video and audio, audio-only, and business letters—and found that the more channels a communication medium has, the higher its social presence. For that reason, people will choose or avoid a particular medium for a certain type of communication according to variation in its capacity to convey social presence. ACMC as described by this assumption is low in social presence because it is devoid of multiple channels that can convey social and contextual information (Thurlow et al., 2004).

Social presence is closely related to the concept of immediacy, the "communicative behaviors that enhance closeness to and nonverbal interaction with another" (Mehrabian, 1969, p. 203). Although these terms are different in detail, they have been used interchangeably in much of the literature (Thurlow et al., 2004). Social presence or immediacy is characterised in part by the physical or psychological distance one puts between oneself and the interactant, which can be the object of communication or the addressee. According to Baringer and McCroskey (2000), social presence can be projected through various communication channels (e.g., eye contact and facial expression) that "allow people to share thoughts and feelings with each other" (p. 178). Based on the literature, social presence behaviour can reduce the psychological distance and enhance the sense of intimacy[16] between teachers and students (Christophel, 1990; Frymier, 1994; Kelly & Gorham, 1988; Richmond, Gorham, & McCroskey, 1987). Positive correlations between social presence and students' learning processes and outcomes were also found (Sanders & Wiseman, 1990).

5.2.1.2 Media richness model

Like the social presence model, the media richness model (Daft & Lengel, 1984; 1986; Trevino, Lengel, & Daft, 1987) is based on the assumption that communication media are different in their richness. It is defined by Daft and Lengel (1986) as the capacity of

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[16] Intimacy is the sense of closeness and the state of interpersonal relationships. According to Argyle and Dean (1965), both verbal and nonverbal behaviours, such as physical proximity, eye contact, and smiling, affect the level of intimacy. Many empirical studies suggest that social behaviours that indicate a sense of social presence or immediacy (e.g., self-disclosure) help develop a higher degree of intimacy (Griffin, 2000).

communication media to process rich information determined by their abilities to provide instant feedback, transmit multiple cues, personalise messages, and facilitate language variety. O'Hair, Friedrich, and Shaver (1998), in addition, characterise the richness of media as the "ability of a communication channel to handle information or convey the meaning contained in a message" (p. 60).

According to the media richness model, face-to-face is perceived as the richest medium because it provides immediate feedback, multiple cues, and message content that can be expressed in a natural form (Daft & Lengel, 1986). On the other hand, text-based communication, such as e-mail or computer conferencing, is perceived as a leaner mode because nonverbal cues are absent from the communication channel. As a result of the media's capacity to convey cues, rich media are more suitable for "equivocal tasks" (e.g., disagreement and conflict resolution) in which the information contains multiple and debatable interpretations. In contrast, lean media are less appropriate for performing such tasks because they can transmit fewer social cues and limited feedback (Rice, 1984; Steinfield, 1986; Walther, 1992). "The more complex the communication task, the richer the medium that is needed" (Thurlow et al., 2004, p. 50).

5.2.1.3 Reduced social cues model

Like the other models in the cues-filtered-out approach, the reduced social cues model (Siegel, Dubrovsky, Kiesler, & McGuire, 1986; Sproull & Kiesler, 1986) focuses on the quality of the media to convey social cues in mediated communication. This model assumes that the quality of communication media has an effect on communicative outcomes. In particular, it claims that a lean medium, such as ACMC, is low in social presence as it filters out social aspects of communication. This situation means that the psychological distance among people in that communication is increased, leading to an excessively more task-focused and less relationship-focused communication (Thurlow et al., 2004).

According to Lea, O'shea, Fung, and Spears (1992), the lack of immediacy derived from delays inherent in the nature of the medium can decrease the effects of social feedback. Such delays and the missing cues can increase frustration in mediated communication. Also, if social cues and the sense of social presence associated with the use of ACMC are absent, people can become more self-centred and uninhibited, thus making such

unfavourable communication behaviour as flaming more likely to occur (Kiesler, Siegel, & McGuire, 1984; Sproull & Kiesler, 1986). This anti-social behaviour creates a hostile environment that can later hinder a high level of social presence, as well as the collaborative learning process.

5.2.2 What is missing?

A common theme of theoretical frameworks in the cues-filtered-out approach is the limited social cues afforded by the structure and bandwidth of the medium. According to this approach, the reduction of essential cues in ACMC situations affects communication in many ways. Compared to face-to-face interaction, communication via ACMC is cold, impersonal, low in social presence, and overly task-oriented (see Thurlow et al., 2004). The reduced cues contexts may also diminish social and normative constraints, causing uninhibited behaviour in online communication. However, many researchers criticise this approach and propose a somewhat different view. In fact, what is mainly absent from the traditional approach is a concern about social influence and social contexts that affect computer-mediated interaction. Walther (1992) notes that although ACMC "is used to fulfill a variety of purposes, the social presence and lack of social context cues work has focused largely on the structural characteristics of communication via the computer channel, without as much consideration of contextual and functional processes" (p. 56). Therefore, he proposes a relational communication perspective (see Section 5.2.3), emphasising that functional and social factors in online communication should be examined.

As far as the social presence model is concerned, Walther (1992) also claims that it is not obvious from the model whether the communication media or individuals in the communication situation create a feeling of social presence. In other words, whether social presence is a result of the ability of the medium itself or the users modifying their behaviour in mediated communication to create the feeling of being present is questionable. Many research studies (e.g., Gunawardena, 1995) support the latter idea, providing evidence that users in asynchronous text-based environments develop an ability to express missing nonverbal cues in textual forms. As Steinfield (1986) emphasises, "social presence, although thought to be an attribute of the media, was generally measured by examining subjective perceptions of media characteristics.

Perceived characteristics of the channel therefore are used to predict the amount of task-related and social use" (p. 781).

Fulk, Schmitz, and Steinfield (1990) also criticise the cues-filtered-out approach, such as the media richness model, in terms of its objectivity in media selection. They argue that media choices are subjective and socially constructed. In other words, media selection is not only a rational process but also a socially influenced activity. Another criticism is that the media selection process should be based on the suitability of the media to a particular task or particular situation, not their richness[17]. As opposed to the claims by the media richness model, ACMC can be an effective medium for teaching and learning processes in OLCs because:

- Immediate feedback may not always be suitable for learning where more time to reflect before responding to the discussion is needed (Hiltz, 1998);
- Nonverbal cues can be compensated for by alternative behaviour through other communication channels (e.g., text) (Rice & Love, 1987);
- Personalised communication to a particular student can be done through ACMC applications, such as e-mail systems (Berge, 1995);
- The sense of social presence created by online participants can convey emotion and feelings through lean media (Gunawardena, 1995).

Finally, instead of discouraging, many research studies (e.g., Gunawardena, 1995) claim that communication and discussion in reduced cues environments are not only active but also interactive. Without social cues, people feel more comfortable expressing their ideas (Siegel et al., 1986) and become more active in democratic learning environments (Hiltz, 1995). Hiltz (1995) mentions that learning in asynchronous text-based contexts "allows all students an equal opportunity to ask questions and make comments, even if they have difficulty in putting their ideas into words quickly" (p. 11).

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[17] Newberry (2001) notes, "attempting to rank media choices does not imply that one is better than the other. Each media type has its own advantages and disadvantages and each is probably more appropriate than the others in different situations". Retrieved 15 January 2004, from http://www.learngen.org/resources/module/lgend101_norm1/200/210/211_3.html

On this basis, ACMC can become an effective communication method among online participants, and can be used to support social presence development and the collaborative learning process in OLCs. This notion is supported by the preliminary findings from the previous chapter, as well as some theoretical models from the relational approach that focus on social aspects of communication processes. In the following section, some influential models, such as the social information processing and equilibrium models used to represent the relational perspective of ACMC, are discussed in detail.

5.2.3 Relational approach

5.2.3.1 Social information processing model

The social information processing model (Walther, 1992; Walther, Anderson, & Park, 1994), anchored in social cognition and interpersonal relationship development theories, suggests that interaction in a mediated situation is as deeply relational as that in face-to-face communication. Walther (1992) claims that there are inconsistent results between many experimental and field studies[18]. While experimental studies report that communication in asynchronous text-based environments is less personal, friendly, and emotional, field studies suggest otherwise. In their experiment, Short et al. (1976) asked research participants to rank different types of telecommunication media based on the media's ability to convey a sense of presence. They found that text-based media (e.g., business letters) are extremely low in the degree of social presence, making the message cold and impersonal, compared to face-to-face communication. Rice and Love (1987), in contrast, found a significant number of social messages in an ongoing electronic bulletin board in their field study. Gunawardena (1995), who conducted two field studies, also found that text-based communication (e.g., ACMC) is perceived as interactive, active, interesting, and stimulating by conference participants.

For Walther (1992), the difference between mediated and face-to-face communication is not the quality of a medium, but the "time" required to convey social information. He

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[18] In experimental studies (e.g., Short et al., 1976), research participants are requested to compare and rank the ability of media (e.g., face-to-face, telephone, business letters) to transmit socioemotional content (e.g., social presence). On the other hand, in field studies (e.g., Rice & Love, 1987), the expression of such a socioemotional information among research participants are observed and recorded by researcher(s) over a period of time.

argues that the impersonal communication via ACMC may be strictly limited to initial stages of relationship development and that these effects should disappear over time. In other words, compared to a face-to-face situation, socioemotional content can be delivered through a mediated environment, but it takes longer for people to develop their relationships. According to Walther (1992), changes in relational communication might not be perceived in a time-limited situation. However, "given sufficient time and message exchanges for interpersonal impression formation and relational development to accrue, and all other things being equal, relational valances in later periods of [A]CMC and face-to-face communication will be the same" (p. 69). Although relational development may be expected to come about over time in zero-history groups, previous relationships help increase the development process among online members (Walther, 1992).

Walther (1992) also argues that both task-related and socioemotional information can be transmitted through ACMC. The excessively task-oriented attributes of ACMC claimed by many experimental studies could arise from some other factors apart from the inherent quality of such a medium. Task complexity and environmental uncertainty, for example, are also associated with increasing task orientation in asynchronous text-based correspondences (Steinfield, 1986). Finally, like those operating face-to-face, online participants also need to increase intimacy and reduce uncertainty in their communication. They will therefore modify their behaviour in order to transfer relational and social signals in reduced cues situations. This notion has been supported by many research studies, especially the recent work related to social aspects of online communication. Danchak, Walther, and Swan (2001) also agree that the cues-filtered-out approach has been challenged by "a growing recognition that the active behaviours of telecommunicators are quite amenable, and spontaneously adaptable, to the communication of such functions as may be referred to as presence". The equilibrium model described in the next section explains this concept further.

5.2.3.2 Equilibrium model

Argyle and Dean (1965) first provided the concept of equilibrium, in which people develop degrees of closeness or remoteness towards each other in a communication situation. Equilibrium is the optimal degree of factors affecting the overall level of intimacy, including eye contact, facial expression, and personal topics of conversation.

Based on this concept, individuals establish an optimal level of interaction involvement and attempt to maintain it throughout the communication. If this equilibrium is disrupted by an increase or decrease in intimacy through one communication channel, individuals will attempt to adjust their intimacy level through the same or other channels to maintain equilibrium. Argyle and Dean (1965) provide an example of two people in a face-to-face conversation. In this situation, people will adjust their seating positions until an optimal level of intimacy is reached. If personal topics are to be discussed, people will reduce eye contact and increase physical space in order to maintain equilibrium. Although they do not mention it directly, Short et al. (1976) are also aware of the equilibrium compensating strategy in mediated communication (e.g., a telephone conversation). As they note, "the actor will modify his behaviour; thus head-nods indicating agreement may be replaced by verbal phrases, such as 'I quite agree'" (p. 64).

As opposed to the cues-filtered-out perspective, Walther (1992) argues that social information can be conveyed through ACMC although the process may take longer than that of face-to-face interaction. Because of the need to communicate successfully, people in text-based communication compensate for the lack of nonverbal cues by making their feeling and attitudes more explicit through verbal mechanisms. As he states, "theoretical and empirical work in this area has taken explicit notice of cue substitutability, and the opportunity for communicators to replace their nonverbal expressions… with verbal indicators seems clear" (p. 75). In other words, online participants adapt their behaviour and increase their socioemotional expression in written formats to convey affective communication and compensate for the missing communication channels (Gunawardena, 1995; Hiltz, 1995). Hiltz (1995) supports this idea, emphasising that the lack of nonverbal cues in ACMC situations "may limit information that serves to improve perception of communication partners, to regulate social interaction, and to provide a social context for communication. On the other hand, participants may explicitly increase overt social-emotional expressions… to compensate for the missing communication channels" (p. 28).

In a recent study, Danchak et al. (2001) propose an equilibrium model (Figure 3) in which participants in mediated communication maintain equilibrium by increasing immediacy behaviours to compensate for the reduction in an affective communication channel.

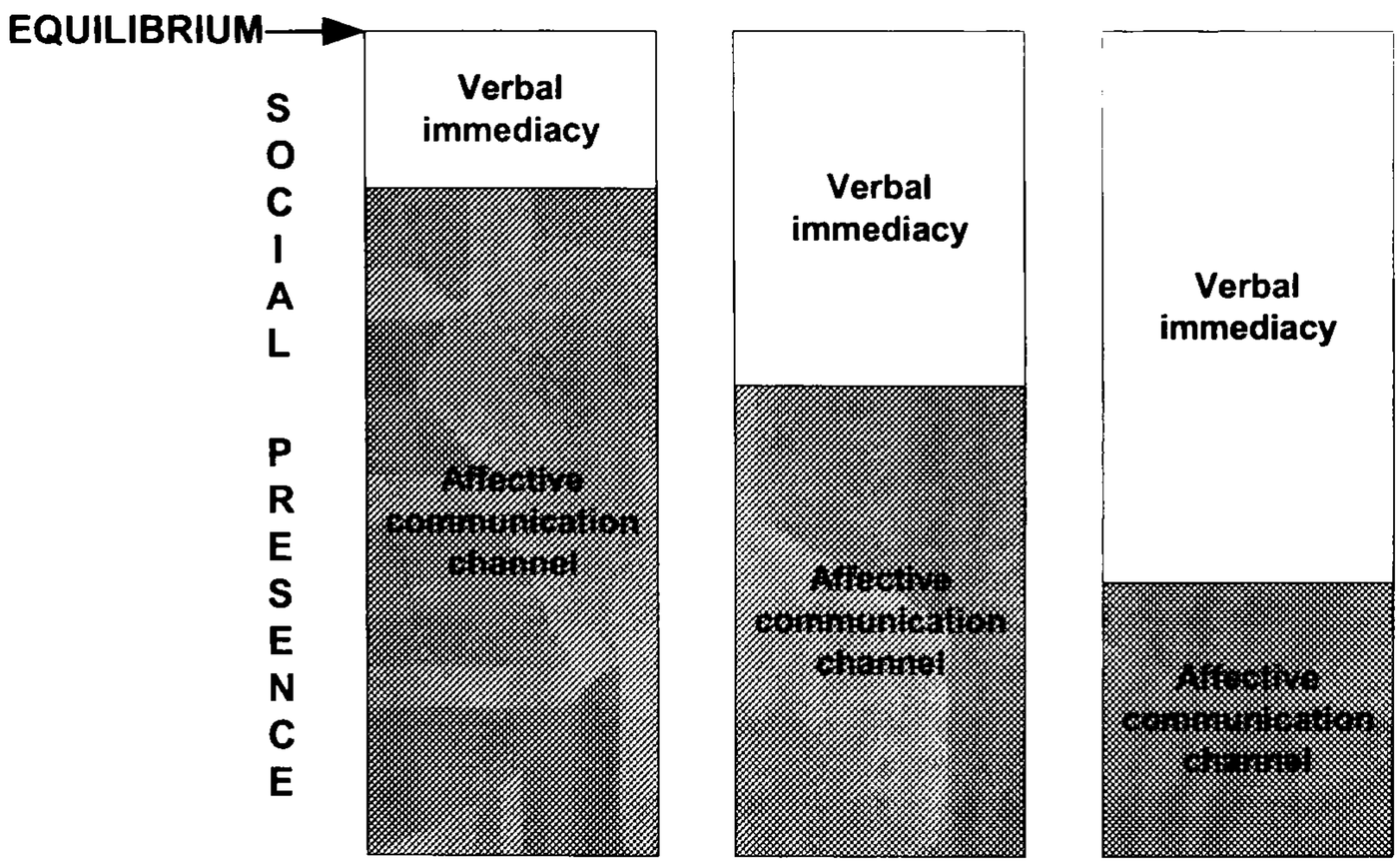

Figure 3 Equilibrium model of social presence (Danchak et al., 2001)

According to Danchak et al. (2001), participants in multiple affective communication channels (e.g., face-to-face) require fewer verbal interactions as nonverbal cues can sustain the equilibrium of intimacy and social presence. However, in ACMC situations, where nonverbal cues are absent, participants need higher levels of verbal immediacy to substitute for the missing nonverbal cues and preserve their sense of being present. This also supports the notion that social presence can be cultivated in text-based environments (Gunawardena, 1995). Gunawardena (1995) also points out that "despite the low social bandwidth of the medium, users of computer networks are able to project their identities whether 'real' or 'pseudo', feel the presence of others online, and create communities with commonly agreed on conventions and norms that bind them together to explore issues of common interest" (p. 156).

To summarise, the concept of social presence described in this thesis is based on the relational aspect that focuses more on the ability of users in mediated communication in projecting or performing behaviour that conveys a feeling of social presence. To gain a deeper understanding of social presence in OLCs, it is worth exploring further its classifications, as they will provide a better knowledge of how social presence is applied by other research studies and what aspect of social presence is used in the current research.

5.3 Classifications of social presence

The concept of social presence is vague and overly broad (Biocca, Harms, & Burgoon, 2003). However, a clear definition of the term used is important for the study of social presence. According to Biocca, Harms, and Burgoon (2003), a well explained concept is required because of the need to understand the roles of social presence in technology-mediated interaction, as well as to gain the necessary conceptual clarity in order to continue research in this area. To gain a better understanding of the aspects of social presence, Biocca et al. (2003) cluster social presence definitions into three major classifications—copresence, psychological involvement, and behavioural engagement (Table 13).

Classification	Definition	Examples of studies
Copresence		
Sensory awareness of the embodied other	• "Experiencing someone else with one's naked senses" (Goffman, 1959, p. 15). • "Physical distance over which one person can experience another with the naked senses-thereby finding that the other is 'within range'" (Goffman, 1959, p. 16). • "Full conditions of copresence, however, are found in less variable circumstances: persons must sense that they are close enough to be perceived in whatever they are doing, including their experiencing of others, and close enough to be perceived in this sensing of being perceived" (Goffman, 1959, p. 17).	Biocca & Nowak (1999); Biocca & Nowak (2001); Ciolek (1982); Nowak & Biocca (1999); Nowak & Biocca (2001)
Colocation	• "The feeling that the people with whom one is collaborating are in the same room" (Mason, 1994). • "The feeling of being socially present with another person at a remote location" (Sallnäs et al., 2000). • "The degree of tangibility and proximity of other people that one perceives in a communication situation" (McLeod et al., 1997, p. 708).	Mason (1994); McLeod et al. (1997); Sallnäs et al. (2000); Tammelin (1998)
Apparent existence, feedback, or interactivity of the other	• "The extent to which other beings in the world appear to exist and react to the user" (Heeter, 1992). • "The degree to which a person is perceived as a 'real person' in mediated communication" (Gunawardena 1995, p. 9).	Cuddihy & Walters (2000); Culnan & Markus (1987); Gunawardena & Zittle (1997); Palmer (1995)
Sense of being together	• "The sense of being together" (de Greef & Ijsselsteijn, 2000; Cho & Proctor, 2001).	

Psychological involvement		
Salience of the other	• "The degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships…it is a subjective quality of the communications medium… " (Short et al., 1976, p. 65). • "A single dimension representing a cognitive synthesis of all the factors" (Short et al., 1976, p. 65). • "Attitudinal dimension of the user, a 'mental set' towards the medium" (Short et al., 1976, p. 65). • "It is a phenomenological variable… affected not simply by the transmission of single nonverbal cues, but by whole constellations of cues which affect the 'apparent distance' of the other" (Short et al., 1976, p. 157).	Galimberti (1997); Gunawardena (1995); Huang (1999); Rice (1993); Riva (1998); Tammelin (1998)
Immediacy and involvement	• "Directness and intensity of interaction between two entities" (Mehrabian, 1967, p. 325) or psychological distance between interactants (Wiener & Mehrabian, 1968). • "The sense of being present in a social encounter with another person" (McLellan, 1999, p. 40). • "The ability of learners to project themselves socially and affectively into a community of inquiry" (Rourke et al., 2001a, p. 50). • "The ability of participants… to project their personal characteristics into the community, thereby presenting themselves to the other participants as 'real people'" (Garrison et al., 2000).	Rourke et al. (2001a); Swan et al. (2000)
Perceived access to another intelligence	• "The minimum level of social presence occurs when users feel that a form, behavior, or sensory experience indicates the presence of another intelligence. The amount of social presence is the degree to which a user feels access to the intelligence, intentions, and sensory impressions of another" (Biocca, 1997).	Huang (1999); Nowak (2000)
Mutual understanding	• "Social presence; that is, the ability to make one's self known under conditions of low media richness" (Savicki & Kelley, 2000).	
Behavioural engagement		
Interdependent, Multichannel exchange of behaviours	• "VR is compatible with interpersonal communication to the extent that individuals can encounter another 'social presence' or person (Heeter, 1992) in a virtual environment, and effectively negotiate a relationship through an interdependent, multi-channel exchange of behaviors" (Huang, 1999, p. 291).	Huang (1999)

Table 13 Social presence definitions (After Biocca et al., 2003)

The first aspect of social presence is copresence. Derived from a concept of Goffman (1959), copresence emphasises the sensory awareness of other users. Although the work of Goffman (1959) concentrates primarily on physical settings, the concept can also be applied to mediated communication. Biocca et al. (2003) define this aspect as the lowest level of social presence because it involves minimal acknowledgment of the other's

identity, intentions, and attention. According to Nowak and Biocca (1999), technological innovation offers new types of settings in which visual images and characters can magnify the sense of copresence. Related to the concept of copresence is the feeling of colocation in a given setting, which can be found in the definitions used by many researchers, such as Mason (1994) and Sallnäs, Rassmus-Gröhn, and Sjöström (2000). Additionally, the concept of copresence also embraces the sense of mutual awareness among online participants extending towards existence, feedback, or interactivity (Gunawardena, 1995; Heeter, 1992) and a sense of being together (De Greef & IJsselsteijn, 2000)

Psychological involvement, the second dimension of social presence, is based on the concept of immediacy (Wiener & Mehrabian, 1968) applied to research in telecommunication (e.g., Short et al., 1976). This aspect suggests that social presence should embrace psychological involvement of the others since a sensory awareness alone may not be sufficient. Biocca et al. (2003) also note that "the simple presence of another body or even awareness of it may be satisfactory to signify some minimal level of physical copresence. But does this capture all that most researchers mean by social presence? Let us take an extreme example. It is clear that an inert body, a corpse, may be physically present, but not socially present" (p. 463). Psychological involvement relates to the emotional connection among participants developed through social interaction and affective communication. It is a higher level of social presence because it involves a deeper sense of involvement, access, and connection to the affective and cognitive state of the others (Biocca et al., 2003). Many current definitions (e.g., Rourke et al., 2001a) incorporate this dimension as an important element of social presence.

The third aspect of social presence is behavioural engagement, in which online participants are connected, responsive, and interdependent. This category is considered the highest level of mediated social presence conveyed through a multichannel exchange of behaviour. As a result, social presence in this sense refers to the extent to which people feel that others exist in a virtual environment (VE) (Heeter, 1992). As noted by Biocca et al. (2003), "reference is made to levels of behavioral engagement such as eye contact, nonverbal mirroring, turn taking, and so forth….Immersive virtual environments and computer games have opened a much wider range of potential channels for behavioral interaction" (p. 465).

Although several attempts to define social presence more systematically have been made, some unidentified areas still exist. Based on the definitions described, social presence can be perceived from different aspects and at different degrees. This research defines the term social presence as the psychological involvement in communication processes in which participants not only perceive the presence of others, but also have a certain degree of emotional involvement with the others in mediated communication. This is based on three major grounds. First, it is believed that a sense of awareness of the others on its own cannot create active social interaction and collaborative learning in online environments. The concept of copresence and mutual awareness is important for online learning, as it can reduce the social isolation derived from geographical separation. However, collaborative learning in such environments requires more than just the presence of others. Second, the concept of social presence as a psychological involvement is closely related to a foundation of this research that focuses on social interaction and social elements that affect learning in mediated environments. Finally, social presence as the behavioural engagement in virtual reality (VR) is far beyond the scope of this thesis and cannot be achieved through ACMC applications.

In this section, the literature has been reviewed to survey the general background of social presence. The theoretical frameworks and concept of social presence used in the research have also been clarified. In the next section, social presence, particularly in the context of education and online learning, is further described. Examples of social presence studies presented in the following section provide a better understanding of how the concept is applied in education and demonstrate the significance of social presence for learning.

5.4 Social presence and learning

5.4.1 Social presence in traditional classes

Social presence has various positive impacts on teaching and learning in both traditional and technology-based classrooms (Gunawardena, 1995). Many studies in traditional face-to-face classrooms have focused on the social presence of teachers, usually called "teacher immediacy", and have related such behaviour to positive students' learning (Christophel, 1990; Fayer, Gorham, & McCroskey, 1993; Frymier, 1994; Gorham, 1988; Hackman & Walker, 1990; Kelly & Gorham, 1988; Richmond et al., 1987). A study by

Kearney, Plax, and Wendt-Wasco (1985), for example, showed that social presence or psychological proximity had a positive impact on affective learning. In some other studies, social presence also affects the development of favourable attitudes towards learning (Fayer et al., 1993) and is highly correlated with positive learning outcomes (Christophel, 1990).

Gorham (1988) identifies social presence behaviour that influences cognitive and affective learning. This involves using humour in class, praising students' work, providing personal examples, asking questions or soliciting viewpoints, encouraging students' discussions, and using group reference terms, such as we and our. From her study, she reported that both the verbal and nonverbal social presence behaviour of the teacher was highly correlated with both the affective and cognitive learning of students. Kelly and Gorham (1988) conducted an experiment to investigate the relationship between social presence and cognitive learning by testing students' ability to recall word-number sequences. They found that positive social presence behaviour was associated with short-term recall. Rodriguez, Plax, and Kearney (1996) also reported a positive relationship between such behaviour and student cognitive learning.

In addition to the cognitive aspects of learning, the social presence projected by teachers also has a positive effect on learning motivation (Christensen & Menzel, 1998; Christophel, 1990; Frymier & Shulman, 1995). Two studies conducted by Christophel (1990) revealed a correlation between social presence and student motivation. From the studies, student learning increased when the teacher created either verbal or nonverbal social presence behaviour, such as questioning techniques and motivational messages. On the other hand, such behaviour as coercion and threats somewhat increased learning but could generate a negative effect on learning in the end. The results from the studies by Christophel (1990) were also supported by Frymier and Shulman (1995) stating, "teacher immediacy may have a positive impact on students' motivation because it helps to increase attention, build confidence, and improve satisfaction" (p. 41). Likewise, Christensen and Menzel (1998) found a positive relationship between social presence behaviour and perceived motivation in learning.

Many studies in this area also attempt to examine the impact of social presence in a multicultural classroom (McCroskey, Fayer, Richmond, Sallinen, & Barraclough, 1996;

Powell & Harville, 1990; Sanders & Wiseman, 1990). Powell and Harville (1990), for example, reported small differences among students from different subcultures—Non-Hispanic Caucasian, Latino, and Asian-American—in terms of the relationships between social presence and four affective variables. Similarly, the study conducted by Sanders and Wiseman (1990) with students from four ethnic subgroups—Hispanic, Non-Hispanic Caucasian, Asian-American, and African-American—revealed no differences between each group in terms of the relationship between social presence and cognitive learning. However, they found differences between the Hispanic group and Asian or Black groups in terms of the relationship between social presence and affective learning. In their study, moreover, McCroskey et al. (1996) reported that social presence positively correlated with the perceived learning of college students in four cultural groups—American, Australian, Finnish, and Puerto Rican.

5.4.2 Social presence in distance and online classes

The benefits of social presence in learning are also reflected in distance and online learning situations (Hiltz, 1998). Although social presence research in distance and online learning is still in its infancy, studies conducted in this area point towards social presence as a significant factor that has a positive impact on the learning process and outcomes (Tu, 2002). Hackman and Walker (1990) studied the effect of interactive televised classrooms on social presence and student learning. They found that social presence behaviour, such as smiling, praising, using humour, encouraging feedback, and personalising examples, enhanced satisfaction and perceived learning. They also found that social presence behaviour not only helped reduce psychological distance and the feeling of isolation of students at remote sites, but also resulted in students' satisfaction with the teachers. Freitas, Myers, and Avtgis (1998), in addition, studied social presence in both face-to-face and synchronous online classroom settings. Although students in the online class perceived nonverbal social presence less than did the face-to-face class, Freitas et al. (1998) found that social presence still had a positive impact on affective and cognitive learning.

Gunawardena and Zittle (1997) conducted a survey and analysis of e-mail messages to examine students' perceptions of social presence in a text-based learning environment. They also found that social presence was a significant factor in learning satisfaction and accounted for 60 percent of variance in overall satisfaction of participants in such a

context. In a recent study, Shea, Swan, Fredericksen, and Pickett (2001) investigated students' satisfaction in asynchronous learning networks and posited that behaviour that sustains a feeling of social presence is important. They concluded that "course developers and instructors should create opportunities and provide support for the development of social presence among students participating in online courses".

Regarding the effects on online participation, Polhemus, Shih, and Swan (2001) explored the implications of the complexity of the online discussion and the influence of social presence on online interactivity. They hypothesised that the quantity and quality of interaction were the result of affective use of language and social presence. In other words, the higher the degree of social presence, the more quantity and depth of interaction in threaded discussion. Their study revealed that "postings with a high degree of social presence were likely to initiate more complex discussions than postings with a low degree of social presence". It also showed that the use of affective language in online discussions generated a trustworthy, reflective learning environment, and allowed online students to express themselves more efficiently and accurately. Tu (2002) and Tu and McIsaac (2002b) examined social presence in an online learning environment and argued that social presence positively influences online interaction. They also suggested that the social context (characteristics of participants and their perceptions), online communication (applications of the language used), and interactivity (activities in which participants engage and their communication styles) are important elements in establishing social presence and a sense of community among online participants, thus promoting online social interaction.

To explore the relationship between social presence and cognitive learning and interaction in online settings, Picciano (2002) conducted a study with students in a graduate course in education administration. He found that social presence was correlated with perceived learning and interaction. He also found that perceived learning and perceived interaction were also positively correlated. Similarly, Richardson and Swan (2003) also examined the roles of social presence in online learning and its relationship to perceived learning and satisfaction. Their study, conducted with students who completed online learning courses, showed that students' perceived learning, satisfaction with teachers, and perception of social presence were highly correlated.

Besides, it also revealed that the perception of social presence was a significant factor of the perceived learning of students in the online courses.

Regarding social presence in OLCs, Swan (2002) used content analysis to examine social presence and verbal immediacy behaviours that support the development of an online community. The findings from her study showed that these behaviours (e.g., self-disclosure) found in asynchronous discussions were used differently at different stages of community development. The findings also revealed that online participants projected their social presence textually to reduce the psychological distance among themselves. The results supported the equilibrium model of social presence developed by Danchak et al. (2001), which conjectures that participants in mediated environments will compensate for the lack of affective communication channels by projecting more immediacy behaviour in the other channels (e.g., text) available to them.

Although social presence can be conveyed among online participants in textual formats, the extent of social presence found in the messages can also vary due to some other factors, including gender differences. While early studies claimed that text-based environments are gender-neutral and provide equal opportunities for class discussions because identities and social markers are removed, findings from many studies on genders in ACMC settings suggest otherwise (e.g., Herring, 1993; 1994). They argue that communication in such mediated environments replicates the patterns of face-to-face interaction, in which different communication styles and unequal participation typically occur between males and females. If this is the case, the expression of socioemotional content such as social presence may also be different between genders in these contexts. The next section describes more fully the literature on gender differences in online communication and its implications for social presence.

5.5 Social presence and gender differences

Research on the relationship between gender and language suggests that there are differences between males and females in terms of communication patterns, power, and control (Belenky, Clinchy, Goldberger, & Tarule, 1986; Fishman, 1983; Lakoff, 1975). For instance, studies reveal that men talk more than women in public settings (Coates, 1986; Spender, 1990). While men are more independent and assertive, women are more likely to be interdependent and supportive (Tannen, 1991). In educational settings,

differences between male and female students are also found in traditional, face-to-face classes (Stalker, 1996) as well as online learning (Blum, 1999). Although it is claimed that women are offered a greater potential to participate and communicate equally with men in cyberspaces where all physical cues are absent (Hiltz & Wellman, 1997), many studies suggest that gender differences in such environments still exist (Barrett & Lally, 1999; Jaffe, Lee, Huang, & Oshagan, 1995; Savicki, Lingenfelter, & Kelley, 1996). Herring (2000) also notes that online communication does not ensure "gender-free, equal-opportunity interaction".

Differences and inequality between genders in online learning are reflected in terms of class participation (e.g., communication patterns and learning styles) and learning performance. When comparing communication patterns of online students in mixed sex groups using computer conferencing, McConnell (1997) found that men tended to talk more than women. The findings were supported by Blum (1999), who conducted a study with adult professionals showing that men tended to dominate online classes. She also indicated that men had separate learning styles while women showed a preference for connected styles; they expressed more concerns, had lower confidence, and requested more help than men did. Gender differences may also result in learning performance among online students (McSporran & Young, 2001). However, the literature so far shows inconsistent views about the impact of gender on cognitive outcomes. Gunn, McSporran, Macleod, and French (2003) conducted a case study involving an online cohort of Information Technology (IT) undergraduates. Their conclusion is that women often perform better than men despite the observable differences in interaction style. In contrast, Arbaugh (2000) found no significant differences in learning performance between male and female internet-based MBA students (see also Barrett & Lally, 1999).

If a disparity between gender in communication styles, class participation, and learning performance can be found in online learning, what has been argued by many studies, as well as by this research, is that social presence behaviours in online contexts are also affected by gender issues. As Lombard and Ditton (1997) remark, "gender may also influence presence. A number of personality characteristics (e.g., introversion/ extroversion, locus of control, and dominance/ submissiveness) may be relevant as well". Recently, much literature has supported the notion that gender has an impact on social presence in online learning environments. According to Wood and Baker (2004),

gender affects social presence behaviors as well as levels of interactivity in these settings. Graddy (2004) also suggests that social presence can be undermined by the tendencies of males to dominate online discussions, which can lead to frustration, disappointment and disengagement. A study conducted by Richardson and Swan (2003) concerning students' perception of social presence and gender showed that gender had an influence on the perceived social presence of online students, and female students perceived a higher degree of social presence than male students did. In their study, Baskin and Barker (2004) also asked students to assign a social presence index (rating 1-5) for learning activities (e.g., lectures, groupwork, interpersonal exchanges). The study revealed that female students perceived higher social presence in learning activities than their male counterparts. Finally, Wong, Shi, and Wilson (2004), who support the notion that gender has an influence on social presence, also reported the results from their study that gender composition affects the perceived social presence of group members.

5.6 Social presence measurements

The social presence concept has recently gained a great deal of attention in the educational literature and sound instruments to measure it have become increasingly important (Rourke & Anderson, 2002a). Various aspects of social presence measurement have been found depending on how researchers define social presence and what dimensions of social presence they are interested in. Biocca et al. (2003) describe two dimensions of social presence measurement: "the fluctuating phenomenal properties of a communication interaction and the relationship it establishes between actor and target, or stable properties of a medium and/or target" (p. 469). Although many researchers in telecommunication and human-computer interaction are interested in the properties of media, they suggest that researchers should measure a transient state that "varies with medium, knowledge of the other, content of the communication, environment, and social context" (Biocca et al., 2003, p. 469).

In an early attempt, Short et al. (1976) applied aesthetic appeal factors from semantic differential scales (Osgood, Suci, & Tannenbaum, 1957) to measure the degree of social presence afforded by communication media. In their study, the measurement of social presence involved users' perceptions of social presence towards different types of media (e.g., face-to-face, audio-video, audio only, and business letters). They used seven-point bipolar scales—unsociable-sociable, insensitive-sensitive, cold-warm, and impersonal-

personal—with 72 managerial civil servants and found that media are different in the degree of social presence. The social measurement tool developed by Short et al. (1976) has also been adopted and modified by many researchers (e.g., Gunawardena, 1995; Gunawardena & Zittle, 1997) to investigate social presence in online learning environments.

However, Biocca et al. (2003) contend that Short et al.'s (1976) original measurement is valid only if the goal is to measure properties of the medium. In other words, this tool may not be appropriate if social presence is considered as a phenomenal state or property of the communication interaction. Tu (2002) argues that social presence is a complicated human perception and far more complex than Short et al.'s (1976) bi-polar scales. He further notes that some social presence instruments developed from Short et al. (1976) (e.g., Gunawardena & Zittle, 1997) also did not consider several important variables. Consequently, he developed the Social Presence and Privacy Questionnaire (SPPQ) based on CMC attitude measurement (Steinfield, 1986) and perceived privacy (Witmer, 1997), which contains various aspects of social presence in mediated contexts (e.g., users' perceptions of interactivity).

Much literature has shown that social presence measurement is based largely on surveys and questionnaires to evaluate the social presence attributes of media (e.g., Gunawardena, 1995; Gunawardena & Zittle, 1997; Short et al., 1976), students' perceptions of social presence in online classes (e.g., Picciano, 2002; Richardson & Swan, 2003), or both (e.g., Tu, 2002; Tu & McIsaac, 2002b). These measures (i.e., surveys and questionnaires) can be useful for examining quantitatively the degree of social presence and can be used to describe the results statistically. Researchers who use these tools can also include different variables related to social presence (e.g., students' perceptions of the course, the tutors, or the overall learning process) in order to generate meaningful correlations among variables (see Picciano, 2002; Richardson & Swan, 2003; Shea et al., 2001).

However, using surveys and questionnaires as the social presence measurement tool might not fulfil the purpose of some research studies (Polhemus et al., 2001; Rourke et al., 2001a; Swan, 2002), including the current research, which aims to observe in detail the development of social interaction and social presence among online participants.

Based on the literature, a useful method to investigate online social presence, which is also applied to this research, is the use of coding templates to categorise social content from online discussions. The social presence template originated from Garrison et al. (2000)'s model of a community of inquiry and was developed by Rourke et al. (2001a) in order to quantify and measure social presence elements in educational computer conferences. To test the effectiveness of the template, Rourke et al. (2001a) investigated conferencing transcripts from two 13-week graduate level courses. These courses were delivered mainly by such computer conferencing systems as FirstClass® and WebCT®. Ninety messages of students (N=14) in the fifth week of the first course and 44 messages of students (N=17) in the sixth week of the second course were coded according to the social presence template. Then the social presence density derived from each course was calculated and compared. Swan (2002) also adopted this social presence template as a tool to explore the development of a sense of community among online students. In her study, 235 messages collected from conferencing discussions in a graduate level course were examined. Although not exactly the same indicators as Rourke et al. (2001a) were applied, Swan (2002) reported that the template was suitable for social presence analysis from conferencing transcripts.

The current research shares some characteristics with Swan (2002)'s work in that it applies the social presence template developed by Rourke et al. (2001a) and content analysis technique to analyse online discussions. However, both studies are also different in many ways. In her study, Swan (2002) focuses on the ways course participants use social presence to support the development of an online community. This current research, on the other hand, concentrates not only on how social presence develops in OLCs, but also on how it affects the learning process and outcomes in such contexts. In addition, this research also aims to improve the tool (i.e., template) and generate more valid findings by applying the tool to a larger number of conferencing messages and over a longer period of time.

5.7 Conclusion

Although some researchers (e.g., Daft & Lengel, 1984) claim that socioemotional content cannot be conveyed through lean media, others (e.g., Walther, 1992) suggest otherwise. The results from the preliminary study (Chapter 4) also showed that ACMC could provide support for social interaction in OLCs. However, social interaction itself

does not ensure active and constructive engagement among online participants (Woods & Baker, 2004). Many research studies indicate that a sense of social presence is also required because it is an underlying concept of such interaction and communication in online environments.

In this chapter, the literature was further reviewed to gain a detailed knowledge of social presence and its various aspects. The theoretical frameworks described previously showed the development of the concept. Early studies typically viewed social presence as the quality of communication media. In recent studies, however, more attention has been paid to the effects of social behaviour in mediated communication rather than media capacity. It can be argued that the quality of media can have an impact but this is not always the case, as communication through such a lean medium as ACMC can be interactive and emotional (Gunawardena, 1995; Walther, 1992). In text-based learning situations, where social and nonverbal cues are missing, online members may also adjust their behaviour to increase a feeling of social presence and affective communication.

Much literature on social presence also shows its constructive impacts on the learning process and outcomes. For instance, teacher immediacy behaviours enhance cognitive learning (Kelly & Gorham, 1988) and are positively correlated with the state of motivation of students (Christophel, 1990; Frymier, 1993). Many positive effects of social presence on both affective and cognitive learning are also found in online situations. Communication that conveys a sense of presence, such as humour and encouragement, is related to student satisfaction and learning performance in online classes (Arbaugh, 2001). Having said that, research on social presence in online learning environments is still in its infancy. It needs further investigation in order to acquire an increased understanding of this social element in such contexts (Richardson & Swan, 2003; Swan, 2002). The question as to how this social element develops is still in doubt for many people, as no previous research has provided enough information to observe its development in such environments. The impacts of social presence on online learning also need to be examined to substantiate previous findings and contribute more knowledge to the field. Before these issues can be addressed, the research methodology, strategy, and tools used to conduct the social presence study are described in detail in the following chapter.

CHAPTER 6

Research methodology

This chapter describes the methodology used in this research. It begins with the questions to be addressed followed by the research design that provides the conceptual framework of the research. The research strategy described in this chapter presents information about the methods and techniques applied to conduct the empirical study in each stage. The social presence template used as the major tool is also explained to provide an understanding of its underlying concepts. Finally, the limitations and methodological issues encountered in this research are discussed.

6.1 Introduction

In order to gain an insight into social presence in OLCs, a research methodology and various methods are utilised. A research methodology is an approach to investigating social reality while a research method is a set of procedures and techniques for data collection and analysis (Strauss & Corbin, 1998). In this research, case study research methodology and a range of research methods used to examine social presence in online learning are presented. Both quantitative and qualitative techniques are applied to obtain and substantiate the findings. In the following section, the central research question is put forward. Two specific questions derived from the central question are also proposed.

6.2 Research question specification

Research questions are essential as tools to provide a good research framework and protocol (Marshall & Rossman, 1999). Defining a clear question to be addressed by the research is not easy and is a starting point of the research design. The questions sets the boundaries on what will be studied, identifies the parameters, and suggests the appropriate methods for data collection and analysis (Strauss & Corbin, 1998). Based on the literature described in the previous chapter, social presence is an important factor that supports the learning process and outcomes in OLCs. However, the infancy of the field

and some research gaps have led to a lack of a comprehensive understanding of social presence, especially in terms of its development and impacts on learning. As stated earlier (see Sections 1.6 and 5.1), the central research question of the thesis is the following:

How does social presence develop in asynchronous text-based OLCs and what are its effects on learning in such environments?

The overall aim is to investigate social presence and gain a better knowledge of this social element in asynchronous text-based online learning. Based on this central question, two specific research questions emerge: 1) How does social presence develop in asynchronous text-based OLCs? 2) What are the effects of social presence on learning in asynchronous text-based OLCs? The research design established to provide an overall framework and research processes for addressing these research questions is described in the following section.

6.3 Research design

A research design is a conceptual model that provides a guideline for collecting, analysing, and interpreting data, allowing the researcher to draw a valid inference from the variables under investigation (Frankfort-Nachmias & Nachmias, 1996). According to Yin (1994), a research design is "an action plan from getting from here to there, where here may be defined as the initial set of questions to be answered, and there is some set of conclusions (answers) about these questions. Between here and there may be found a number of major steps, including the collection and analysis of relevant data" (p. 19). Figure 4 illustrates the conceptual framework of this research.

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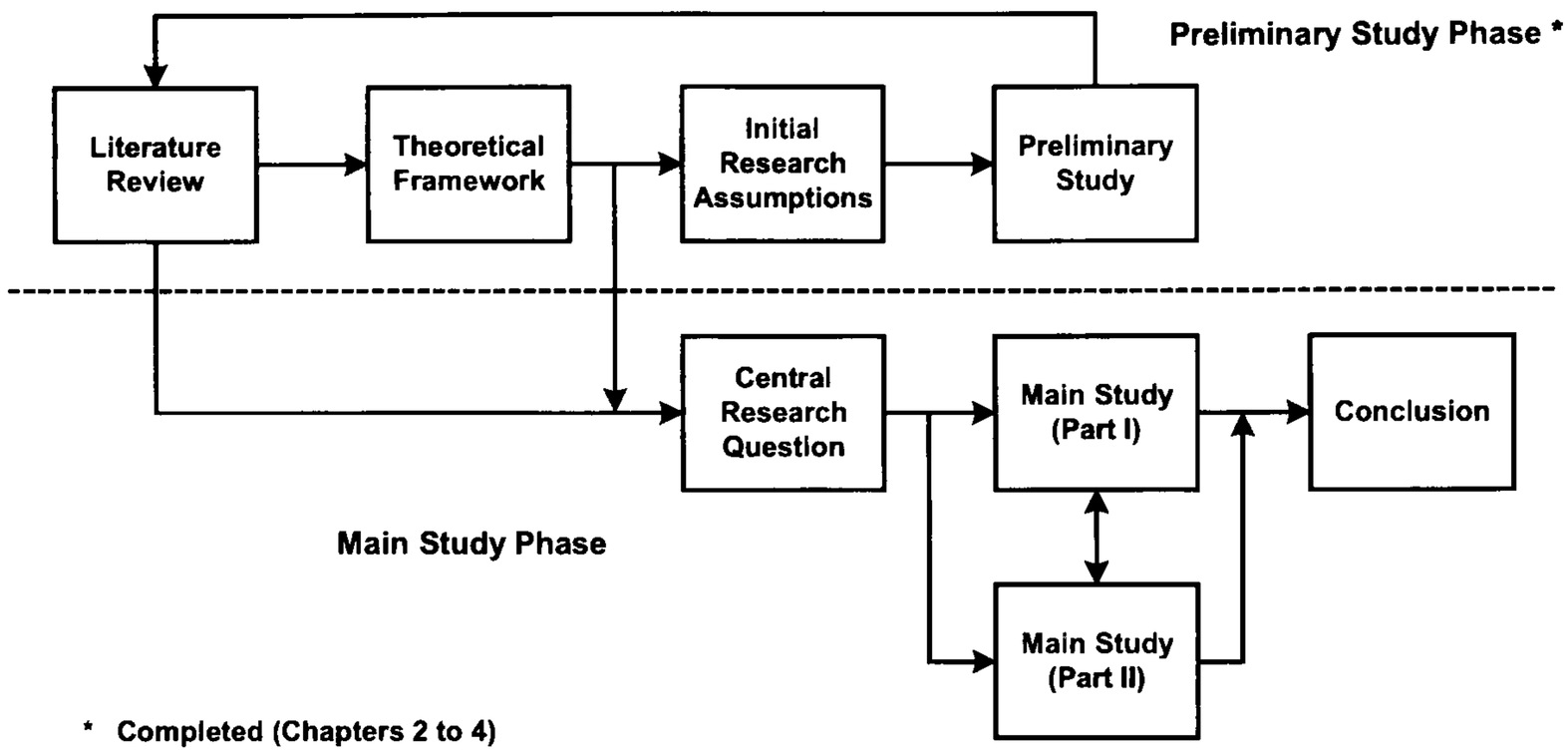

Figure 4 Conceptual research framework

In the preliminary study phase (Chapters 2 to 4), the literature in the areas related to OLCs was reviewed in order to gain a theoretical foundation of the overall context. The preliminary study was also designed to validate the initial research assumptions derived from the literature and to confirm an understanding of OLCs. After this phase, the researcher was in a position to narrow down the research topic and define it in more depth.

In this main study phase (Chapters 5 to 9), social presence in OLCs has become the major focus of the research. The central research question was formed early in this phase. The two specific research questions developed from the central research question are addressed separately. The first part of the main study (Chapter 7) is designed to address the first research question by investigating the development of social presence among online participants in OLCs. Content analysis is used as the research method to analyse data obtained from text-based online conferencing. Quantitative findings from content analysis are also supported by qualitative data derived from the conferencing messages. The second part of the main study (Chapter 8) is designed to address the second research question by exploring further social presence in relation to other learning factors using various statistical techniques. The findings derived from each empirical study are discussed to obtain a deep knowledge of social presence in OLCs. The overall conclusions drawn from the research findings are then formulated (Chapter 9).

6.3.1 Case study research

This research applies case study research methodology as the major approach to explore social presence in OLCs. Case study is "an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (Yin, 1994, p. 13). It is the study of the particularity and complexity of a single case aiming to understand its activity within a particular situation (Stake, 1995). Case study is also a preferred strategy when the focus is on a current phenomenon and when control over the context cannot be obtained. It usually relies on multiple approaches to data collection and multiple sources of evidence to gather as much data as possible in order to obtain research validity. Accordingly, this research applies such different techniques as content analysis and statistical analysis to gain better knowledge of social presence and answer the research questions.

6.3.2 Longitudinal approach

The research uses a longitudinal approach to gather data from a case study. Longitudinal study or trend study (Borg & Gall, 1983) is a research technique used to discover patterns and development over an extended period (Babbie, 1998). As clearly defined by Menard (2002), longitudinal research is "research in which (a) data are collected for each item or variable for two or more distinct time periods; (b) the subjects or cases analyzed are the same or at least comparable from one period to the next; and (c) the analysis involves some comparison of data between or among periods" (p. 2). Although it is not always necessary for establishing causal order, longitudinal study is regarded as a technique for creating temporal order, measuring change, and making strong causal interpretations (Menard, 2002). Moreover, a longitudinal approach is suitable for both quantitative and qualitative investigations. According to Molloy, Woodfield, and Bacon (2002), quantitative and qualitative longitudinal studies are different, yet complementary. While quantitative studies aim to provide statistical measures of change in circumstances or attitudes over time, qualitative studies attempt to provide detailed information and a deeper understanding of how and why change occurs.

While longitudinal research provides a comprehensive scenario of an event, it is difficult and time-consuming. It also requires a good design at the beginning of the research process. Failing to do so can be detrimental to research (Hakim, 1987). Moreover, high

attrition rates among research participants can lead to research difficulties (Babbie, 1998; Borg & Gall, 1983).

6.3.3 Unit of analysis

A unit of analysis is a particular unit from which the researcher obtains information (De Vaus, 1996). According to De Vaus (1996), identifying a unit of analysis is important because knowing an array of possible units of analysis can help formulate more useful and interesting research questions and types of relevant data. In addition, if data cannot be gathered using a chosen unit of analysis, the research question may be retained by moving to another unit of analysis for which data are available. Stake (1995) suggests that a criterion for case selection is to maximise what can be learned. Because time for and access to fieldwork are always limited, the cases should be voluntary, easy to get to, and welcoming to the inquiry.

This research looked for an online programme that represents actual learning in text-based OLCs where social presence could be explored. Based on the criteria and scope mentioned earlier (see Section 1.4), the Postgraduate Certificate in Health Economics for Health Care Professionals programme[19] at the University of York was chosen. This international programme was designed mainly for professionals in health care sectors who wanted to apply principles of health economics to their work and for those who wanted to gain an accredited qualification while continuing in their careers. To complete the postgraduate certificate level, students in each cohort needed to undertake four learning modules. Each cohort ran over one year but students could spread their study over a period of time to meet their professional and personal requirements.

The entire programme (48 weeks) was conducted online but there was a compulsory residential workshop at the start, which required students to attend. Other residential sessions were optional but highly recommended. Online participants in the programme communicated mostly through ACMC applications, particularly computer conferencing. Because of the nature of online students and the programme itself, social presence and social factors were expected to play an important part in the communication and

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[19] See Section 4.2 for the full information about this programme.

discussion, thus allowing these elements to be investigated. The number of participants involved in this programme is shown in Table 14.

Class	1st Cohort (2001)		2nd Cohort (2002)	
	Students†	Tutors††	Students	Tutors
Module 1	17	2	17	2
Module 2	16	1	17	2
Module 3	15	2	18	2
Module 4	15	1	17	1

Note:
Each cohort is composed of four learning modules running over an academic year. Each cohort starts in late September with Module 1 and later modules follow on consecutively every three months.
† Thirty two students from two cohorts consented to participate in this research
†† Permission was given from the programme director for the use of the tutors' messages for the purposes of this research.

Table 14 Number of participants

Students in each cohort carried out all four modules to finish the certificate programme. In general, the student population is quite stable and most students begin with Module 1 and finish, in the same academic year, with Module 4. However, some might suspend or drop out of their study due to their personal circumstances. Students who study in the previous cohort(s) and suspend their study can resume it in the following year. For example, Module 3 in the second cohort had 18 students whereas the previous module only had 17 students. In each module, one or two tutors are allocated to provide online students with necessary academic support and advice. The tutors varied from module to module based on their specialisation in particular areas. During the study, students were also supported by various members of staff, including the programme director and a programme secretary, who are actively involved in the programme.

6.4 Research Strategy

6.4.1 Main study (Part I)

In this part of the main study, the online conferencing messages (N= 1296) from two different cohorts, 2001 and 2002, were examined. The period from which the data were collected lasted over one year (48 weeks) for each cohort. Each individual message posted by online participants in each module was analysed according to the social presence template (see Section 6.5.2). The conferencing messages from eight modules were made anonymous and then coded by two coders. The messages were analysed

using a research technique called content analysis (see Section 7.2.1). They were coded and stored in an electronic format, using a software tool for text and message analysis called ATLAS.ti® (see Appendix I). An internal reliability test was also conducted, using intercoder agreement to establish the consistency and reliability of the coding procedures.

After coding, the frequency counts of social presence indicators in each message were prepared and exported to SPSS® for quantitative analysis. First, the tests of differences (e.g., Mann-Whitney U test) were used to compare the level of social presence between the two cohorts. Social presence indicators projected by online participants in each module were examined to observe the patterns of usage of social presence. To gain a better understanding, the social presence expressed by online students across modules was investigated to observe its development in an online learning context. However, the social presence projected by online tutors could not be observed across modules due to the nature of the programme. Unlike students, online tutors were different from module to module throughout the cohort, thus making social presence development across modules impossible to observe. However, the quantitative content analysis from the conferencing messages still provided a useful understanding of social presence patterns by online tutors in each module. The excerpts from computer conferencing among online participants were also used to substantiate the quantitative findings and provide detailed knowledge of how social presence developed in OLCs.

6.4.2 Main study (Part II)

This part carried on the research work from the earlier part of the main study. The overall goal was to obtain a further understanding of social presence among online students and its impacts on learning in OLCs. At this stage, quantitative data from the content analysis were utilised. The observations (N=128) for statistical analysis (e.g., regression analysis) were based on the number of students (N=32) who agreed to participate in the study. Each student who enrolled and finished each module was counted as a unique observation.

In this part, data related to social presence and online learning was gathered. Apart from social presence, major variables included gender, active participation, and learning outcomes. Social presence was based on the number of social presence indicators

expressed by an online student in each module divided by the total number of messages of that student in that module. Active participation was based on the number of messages posted by an online student to the class discussions throughout a particular module. Learning outcomes, in addition, were based on the final examination scores obtained by a student in a particular module. Based on the second research question, the following hypotheses were developed in order to explore these variables in detail. These hypotheses were built on the literature on social presence and its related factors in online learning situations (see Sections 5.4.1 and 5.5).

H_1 There is a significant difference in the expression of social presence between male and female students.

$H_{1.1}$ There is a significant difference in active participation in class discussion between male and female students.

$H_{1.2}$ There is a significant difference in learning outcomes between male and female students.

H_2 Social presence is positively related to active participation in class discussions of online students in OLCs.

H_3 Social presence is positively related to learning outcomes of online students in OLCs.

H_4 Active participation in class discussion is positively related to learning outcomes of online students in OLCs.

Figure 5 Hypotheses for main study (Part II)

Before these hypotheses were tested, assumptions for all statistical analyses were tested to ensure their reliability. Then Pearson's product moment correlation coefficient was used to examine the relationships among social presence indicators (see Appendix N). To test the hypotheses, such statistical analysis techniques as independent samples t-test and regression analysis were used. The first hypothesis (H_1) was tested using an independent samples t-test to explore the differences between male and female students on the expression of social presence. To obtain an understanding of how gender has an impact on learning in OLCs, a t-test was also performed to observe the differences between the two groups in terms of active participation ($H_{1.1}$) and learning outcomes ($H_{1.2}$). Unlike the first hypothesis, the others were tested using regression analysis to determine the relationships between variables. The second hypothesis (H_2) was put forward to examine the relationship between social presence and active participation.

The third hypothesis (H_3), moreover, was proposed to explore the relationship between social presence and the measurable learning performance. In both hypotheses, social presence indicators (e.g., emotion, humour, etc.) were used as the key variables in the multiple regression models. Finally, because active participation among online students could have an impact on learning outcomes, and it is useful to understand how these two variables have a correlation (apart from their correlations with social presence), the final hypothesis (H_4) was introduced. A simple regression analysis was performed to test this hypothesis.

6.5 Social presence template

6.5.1 The modification of social presence template

To examine social presence in terms of its development process and relationship with learning, the social presence template developed by Rourke et al. (2001a), then followed by Swan (2002), was modified and used in this research. Based on the concept of community of inquiry (Garrison et al., 2000), Rourke et al. (2001a) introduced a coding template in order to assess the level of social presence among students in online courses. The template offers benefits in terms of its potential to classify the conferencing messages into theoretically predefined social presence categories. The template divides the expression of social presence into three major categories – affective, cohesive, and interactive responses. Each of these categories contains indicators reflecting communicative behaviours that convey a sense of social presence in text-based environments. Swan (2002) later adopted this construct for her preliminary study on the development of learning communities in asynchronous online courses (see also Sections 5.4.2 and 5.6). Although most of the social presence indicators were based on Rourke et al.'s (2001a) classifications, some additional indicators were drawn up in order to examine social presence in her study.

In the current research, Rourke et al.'s (2001a) original template, as well as Swan's (2002) extension, was used as the basis for a further modification intended for a study of social presence development and its impacts on learning in OLCs. Although the template demonstrates a potential to capture various aspects of social elements in such contexts, it can be improved to make its contents and categorisations more suitable for research in OLCs, and perhaps online communication in general. To enhance its usage, several

indicators were added into the modified template. Some of the original indicators were omitted, split, or combined in order to reflect the nature of online communication. An overview of these modifications is shown in Table 15.

Category	Rourke et al. (2001)	Swan (2002)	Modified template[20]
Affective responses	Expression of emotions	Emotion	Emotion
	Use of humour	Humour	Humour
	Self-disclosure	Self-disclosure	Self-disclosure
		Value	Personal values
		Paralanguage	
Cohesive responses	Vocatives	Vocatives	Vocatives
	Addresses or refers to the group using inclusive pronouns	Group reference	Group reference
	Phatics/ Salutations	Greetings & Salutations	Salutation/Closure
		Social sharing	Phatics
		Course reflection	
Interactive responses	Continuing a thread		
	Quoting from others' messages		
	Referring explicitly to others' messages	Acknowledgement	Acknowledgement
	Asking questions		Inquiry
	Complimenting/ Expressing appreciation	Approval	
	Expressing agreement/ Disagreement	Agreement/ Disagreement	Agreement/ Disagreement
		Invitation	Invitation
		Personal advice	
			Help/Assistance

Table 15 Comparison of social presence templates

The first category of social presence is affective responses. Affective responses are communications influenced by emotions and feelings (Rourke et al., 2001a). In text-based communication, OLC members can convey their affective responses, or emotional expressions, in different ways (Garrison et al., 2000). Three indicators, *emotion*, *humour*, and *self-disclosure*, in this category were adopted from Rourke et al.'s (2001a) original template to describe such communications among participants in OLCs. Additionally,

[20] See Section 6.5.2 for detailed information about the social presence indicators used in this research.

based on Swan's (2002) classifications, *value*, the expression of personal beliefs and ideas, was also introduced and added into the template because it was considered a part of the affective learning process. However, to reflect its function and usage in text-based OLCs, this indicator was relabelled as *personal values*, as it describes how a person as an individual views and relates to the others, as well as to the tasks at hand.

Another category of social presence is cohesive responses. Cohesive responses are communications that signify a sense of community among online participants necessary for the community building process (Garrison et al., 2000). The use of cohesive responses also increases a sense of presence among the participants and enhances their closeness (Garrison & Anderson, 2003). In the modified template, *vocatives* and *group reference* were adopted directly from the original template, as they are communicative behaviours that indicate and enhance a sense of group cohesion. However, the use of *salutation/closure* was defined independently from *phatic* expression. Although these indicators can be used to reinforce social cohesion among online members in text-based environments, the researcher classified them as two separate indicators. An underlying reason is that phatics can have more meaning and imply more social purpose than just saying "hello" to other class members. Exploring these indicators independently then allowed the researcher to examine them in detail. Swan (2002), in the same way, separated these two functions as *greeting & salutations* and *social sharing*. She also attempted to include *course reflection*, which refers to the reflection on the course itself, as another cohesive indicator. However, this indicator did not seem to fit particularly well in this category, as it appeared to describe cognitive aspects of learning rather than social presence.

Interactive responses, the last social presence category, are communications that reflect interactivity among participants in OLCs. Mutual attention and responsiveness is a function that indicates that the other is attending and responding (Argyle & Dean, 1965). Interactive responses indicate that online participants are being attentive to each other in their communication (Garrison et al., 2000). In the modified template, such software features as *continuing a thread* and *quoting from others' messages* was excluded because they did not convey people's sense of social presence or their determination to be socially present. On the other hand, such indicators as *referring explicitly to others' messages*, *asking questions*, and *expressing agreement/ disagreement* were considered

better indicators as they showed a stronger intention and a more effort on the part of online participants to interact with others. Therefore, the researcher adopted these three indicators, and relabelled them to better indicate their functions in online discussions, making them more suitable for the analysis. Rather a separate matter, the researcher combined *complimenting* or *expressing appreciation* into the same category as *acknowledgement* because people in text-based communication generally acknowledge the presence of others by complimenting them on their ideas and contributions.

Swan (2002) introduced such indicators as *invitation* and *personal advice* as interactive responses among online members. Invitation was not found in Rourke et al.'s (2001a) template but it is regarded as an important indicator that describes an attempt of online participants to promote active interaction and a sense of presence with others. This indicator was then added to the modified template. Personal advice, however, was a good interactive response but it did not seem to cover some aspects of social communication in OLCs. Online members, in fact, not only give their personal advice, but also help and provide others with learning support. Therefore, the researcher introduced another indicator, *help/assistance*, which covered the wider aspects of interactive communication in such contexts. Help/assistance is defined as advice, tips, information, learning materials, or other support provided to other members to perform a task.

6.5.2 The modified template

The modified template (Table 16) allows the researcher to quantify social presence elements from conferencing messages. Like the original template, it defines social presence in three major categories, representing communicative behaviours that exhibit a sense of social presence. Each category contains several indicators that denote a more specific form of social presence expression in text-based communication.

Category	Indicator	Definition	Examples
Affective responses	Emotion	The use of conventional and/ or unconventional syntax to convey emotion, feelings and mood	"Phew - my head hurts." "Here is my VERY FIRST ATTEMPT!!!!"
	Humour	The expression of sense of humour	"Unit 1.4 nearly finished me off…!!"

	Personal values	The expression of personal views, beliefs or attitudes	"I hope you all found it useful."
	Self-disclosure	The expression of personal story or vulnerability	"I am a little bit confused now."
Cohesive responses	Group reference	The use of inclusive pronouns, such as we, our, and us	"Can anyone think how else we might plot this data?"
	Phatics	The verbal communication used to establish social relationships	"Happy New Year for all!!"
	Salutation/Closure	The use of salutation and closure in posted messages	"Hi folks"; "All the best"
	Vocatives	The addressing or referring to other class members by name	"I think Susan is correct that…"
Interactive responses	Acknowledgement	The use of acknowledgement or compliment on others' messages	"Thanks George for your answers and the nice graph."
	Agreement/ Disagreement	The expression of agreement or disagreement with others' messages	"John's point is well-taken, but I do not see why…"
	Help/Assistance	The help and assistance, such as answering questions, sharing information and resources, and providing personal advice, etc.	"If any of you guys do not have Adobe on your pc, I will be glad to do the file conversion for you."
	Inquiry	The search for an answer, getting information, making an inquiry, or asking for advice	"Is there anyone out there who is an expert on Excel?"
	Invitation	The invitation of response or comment, asking for the presence or participation, encouraging others' contribution	"Guys, please let me know what you think!" "Any responses welcome!"

Table 16 The modified template (After Rourke et al., 2001a; Swan, 2002)

The following sections describe these social presence categories and their indicators used in the modified template in further detail.

6.5.2.1 Affective responses

Much literature provides evidence that affective communication helps convey a sense of presence and immediacy (Rourke et al., 2001a). Affective use of language also leads to complex interactions and cognitive development in online learning (Polhemus et al., 2001). Four indicators of the affective responses described in the modified template are *emotion*, *humour*, *personal values*, and *self-disclosure*. Essentially, *emotion* is the use of descriptive words to express feelings. It also includes the use of informal syntax and paralanguage—the linguistic features of text-based communication, such as phonetic

spelling, interjections, and emoticons to convey emotion and feelings. The educational literature suggests that emotion is an important part of learning (Goleman, 1995; Shelton, 2000). Emotionally stressful environments can inhibit the learning process (Postle, 1993) while the constructive expression of emotion through verbal and nonverbal behaviours can enhance motivation and learning (Christophel, 1990; Gorham, 1988). The role of emotion is also linked and critical to the process of teaching and learning in online contexts (Martinez, 2001; O'Regan, 2003). Although the capacity to express emotion may be reduced significantly in text-based communication (Garrison et al., 2000), much literature (e.g., Gunawardena & Zittle, 1997; Kuehn, 1993) suggests that online participants can convey their emotions and feelings in written forms.

Researchers involved in a teacher immediacy study (Christophel, 1990; Eggins & Slade, 1997; Gorham, 1988; Sanders & Wiseman, 1990) argue that the use of *humour* is also important and relates to learning. Once students feel comfortable and confident in expressing themselves, the chance of developing strong relationships is greater (Gorham & Christophel, 1990). The use of humour in a classroom is an indication that the teacher is a human being (Hill, 1988). It reinforces student-teacher relationships and helps create a constructive learning environment (Berk, 1998; Palloff & Pratt, 2001). Humour in a classroom can also improve student learning (Berk, 1998; Hill, 1988), as it makes them feel more relaxed and comfortable asking more questions, thus allowing them to reflect and construct new ideas. However, the literature suggests that one should be very careful in the use of humour in an online context. Without nonverbal cues, it is difficult to know whether someone is expressing humour or telling a joke (Davie, 1989).

The expression of *personal values* is a part of the affective learning process (Swan, 2002). Discussions in learning communities where students can exchange their personal views, beliefs, and ideas allow them to gain a valid understanding and knowledge. Apart from students, online teachers or tutors can express their personal values to support students' ideas or provide them with different perspectives. This process allows students to reflect and further explore new solutions by themselves. The use of personal values by online tutors creates a chance for social interaction and affective communication within OLCs. As Garrison and Anderson (2003) note, "through open communication, teachers can reveal their thought processes and thus make themselves more accessible to students" (p. 85).

Finally, according to social penetration theory (Altman & Taylor, 1973), *self-disclosure* is regarded as part of interpersonal relationship development and can have a positive impact on students' learning (Goldstein & Benassi, 1994; Gorham, 1988; Hartlep, 2001). People who use more self-disclosure are perceived as more affable and trustworthy (Altman & Taylor, 1973; Cozby, 1972). Self-disclosure is not merely providing information but sharing stories or information that are personal and frequently relate to their own vulnerabilities. It is a means to know more information about and probably the feelings of others. As Cutler (1995) emphasises, "the more one discloses personal information, the more others will reciprocate, and the more individuals know about each other the more likely they are to establish trust, seek support, and thus find satisfaction" (p. 17). The expression of self-disclosure is not only limited to the interaction among students. In a classroom environment, tutors can also use it to motivate students to learn (Sorensen, 1989).

6.5.2.2 Cohesive responses

Cohesive responses represent activities that build and sustain a sense of belonging and commitment to the community, which is closely associated with the cognitive aspects of an educational experience (Garrison et al., 2000). Four indicators of the cohesive response category described in the modified template are *group reference*, *salutation/closure*, *vocatives*, and *phatics*. The use of *group reference,* sometimes referred to as "inclusivity", reflects a sense of belonging and closeness (Mehrabian, 1981). In online communication, group reference, such as we, our, and us, is a sign of unity and helps reduce psychological distance among group members. The use of an inclusive pronoun can promote a sense of shared purpose and maintain social cohesion between online tutors and students and among students themselves (Hiltz, 1995).

Another social presence indicator of the cohesive response category is *phatics*[21]. Malinowski (1923) coined the term "phatic communion" to describe interpersonal or social communication called "small talk" in which social connections are created by an exchange of a few words. In other words, it is communication used to create an atmosphere of feelings or sociability rather than to impart information. Phatics can be

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[21] The New Oxford Dictionary of English defines phatics as "of denoting or relating to language used for general purposes of social interaction, rather than to convey information or ask questions".

transmitted back and forth throughout the communication process "to keep the line open and to make sure messages are getting through" (Feenberg, 1989, p. 23). Bussman (1998, in Rourke et al., 2001a) also indicates that this type of communication is used to strengthen "ties of union".

Salutation/closure, moreover, is a sentence or phrase used to greet or welcome the others, usually in a casual and sociable manner, at the beginning or the end of the message. In online programmes, the use of salutation/closure allows participants to set the tone of the message, establish a good impression, and make communication more friendly and personal (Garrison & Anderson, 2003). Saluting and closing conferencing messages can be used as supportive behaviours for online interaction (Fahy, 2003). Some researchers (e.g., Rourke et al., 2001a) regard salutation/closure as a function of phatics while others (e.g., Swan, 2002) consider them individual indicators. Although both of them can be used to strengthen the social cohesion among online members, this research also separates them as two distinct indicators in order to examine them more closely.

Finally, online participants can use *vocatives* in their messages to create a personal, friendly learning environment. Vocatives are noun or noun phrases used to indicate the person to whom a sentence is addressed. In other words, online participants use vocatives to address other people by name (Rourke et al., 2001a; Swan, 2002). Research studies (e.g., Gorham, 1988; Sanders & Wiseman, 1990) reveal that using vocatives creates a positive impact on learning. According to Leech (1999), the three functions of vocatives in communication are calling for attention, identifying the addressee, and maintaining and supporting social relations. Among these roles, the social role of vocatives is the most important. In OLCs, vocatives do not only show that there are participants attending or being present in the communication, but also help to create a sense of group cohesion and social connection among participants in OLCs. As Garrison and Anderson (2003) emphasise, "the builders of cohesion begin with indicators such as addressing others by name" (p. 53).

6.5.2.3 Interactive responses

Interactive responses exemplify reciprocal and respectful communication (Garrison et al., 2000). They are important to promote socially meaningful interaction among people

(Rourke et al., 2001a). Eggins and Slade (1997) point out that interactive responses serve several beneficial purposes including establishing and maintaining relationships, indicating mutual support, and showing recognition. They are particularly important in text-based OLCs, where nonverbal cues for establishing and maintaining a sense of social presence and immediacy are not available (Garrison et al., 2000). Based on the modified template, five interactive response indicators include *acknowledgement*, *agreement/disagreement*, *help/assistance*, *inquiry*, and *invitation*.

Acknowledgement indicates a mutual awareness and recognition of others' messages (Garrison et al., 2000). This interactive indicator also includes an expression of praise, admiration, or compliments to other participants. Many studies (e.g., Christensen & Menzel, 1998) support the notion that acknowledgement by complimenting or praising enhances immediacy, which is positively related to students' learning. According to Salmon (2002), acknowledging others' contributions or complimenting other class members on interesting ideas put forward by them can also add value to the class. *Agreement/ disagreement*, communication that conveys approval or disapproval of the ideas expressed by others, is another important indicator of the interactive online learning process (Garrison et al., 2000). The expression of agreement or disagreement encourages students to become more engaged in class discussions (Markel, 2001) and allows online participants to create their sense of presence among each other through the sharing of constructive comments (Anderson et al., 2001). This interactive function also performs a significant role in supporting cognitive development in OLCs. Based on Piaget's constructivism, the interchange of ideas among online participants can provoke disagreement or cognitive conflict, which is a source of intellectual growth (Anderson, 2004)

Help/assistance is another interactive indicator that describes the learning support provided by other participants, such as answering questions, sharing information and resources, and providing personal advice. Mutual help and assistance from other participants have two major consequences in online learning. First, it results in cognitive outcomes, as sharing information or ideas helps people reflect on what they have learned and stimulates their knowledge construction process (Hiltz, 1995; Palloff & Pratt, 2001). Sufficient and appropriate support from both tutors and other students enhances learning and helps students become active participants. Second, it results in social impact among

people in such communities as they have a chance to develop their personal relationships and social cohesion (Palloff & Pratt, 1999).

Inquiry is another interactive communication used by online participants to seek an answer, information, help, or advice from others in OLCs (Rourke et al., 2001a). Asking questions or seeking clarification from other participants helps students develop analytical skills, allowing them to gain new ideas and construct their own knowledge (Levine, 2002 in Anderson, 2004). Tutors in online settings can use this indicator to encourage students' inputs. They can ask open, challenging questions to stimulate new ideas and develop constructive arguments among online students (Anderson et al., 2001). Finally, *invitation* is directly associated with students' and tutors' inquiries with an aim to promote active participation (Swan, 2002). In online learning environments, the use of invitation can create dynamic exchanges among participants (Palloff & Pratt, 1999). Online students can encourage other class members to express their ideas about the discussed topics in order to gain different perspectives. Online tutors, similarly, can ask students to summarise what they have learned to reinforce classroom discussions or stimulate the less active participants (Anderson et al., 2001).

6.6 Methodological issues

In conducting this research, some limitations and methodological issues related to the research practice became apparent. Three major issues involved in the research were subjectivity, generalisability, and ethics. The following sections describe these in detail.

6.6.1 Subjectivity

Subjectivity is an issue common to social research, including content analysis. Rourke et al. (2001a) examined 19 studies that used content analysis in a computer mediated context and found that almost all studies are partly or fully descriptive. Archer, Garrison, Anderson, and Rourke (2001) also emphasise, "it is impossible to avoid some degree of subjectivity in the coding of segments of messages into categories; however, the degree of subjectivity must be kept to a minimum, or the value of the study will be seriously compromised". The fundamental issue of subjectivity rests on the manifest-latent issue. Particularly, content analysis researchers argue whether content analysis should be limited to the surface meaning of the text, or be used to analyse the deeper layers of meaning hidden in the document (Holsti, 1969).

Manifest content, or surface meaning of the text (Holsti, 1969), is the element that is physically present and countable. It is straightforward and reliable (Berelson, 1952). Much research related to content analysis focuses on this type of content because of its objectivity. Latent content, on the other hand, is content that cannot be measured directly (Hair, Anderson, Tatham, & Black, 1998). According to Berelson (1952), although objective, systematic, and quantitative description of communication content is important for content analysis, the question raised is whether "there is such a thing as manifest content" (p. 19). As long as meanings are attached to the symbols and predispositions of the readers become involved, to some degree, they can distort the concept of manifest content. Berelson (1952) adds, "there is no guarantee that the meanings in the 'manifest content' are the same as the meanings actually understood by the different readers or intended by the writer; and thus only latent content can exist wherever meanings are involved" (p. 19).

This research, like many recent content analysis studies (e.g., Rourke, Anderson, Garrison, & Archer, 2001b), pays more attention to latent content that requires in-depth interpretation but provides meaningful explanation on the subject. Gray and Densten (1998) also encourage the focus on the latent aspect of content as a way to integrate both quantitative and qualitative approaches to content analysis. Although latent content is intrinsically subjective, "many educational researchers are more interested in struggling with the important (though hidden) facets of individual and social cognition rather than assessing that which is most easily measured" (Rourke et al., 2001b).

In fact, there are several attempts to deal with the subjectivity of latent aspects of the messages. Holsti (1969) applies a technique that assigns manifest content and latent content to different stages. Such manifest content as words is classified at the coding stage and is limited to the categories which actually appear in the document. The latent content, however, is reserved for the interpretation stage when the coder has more time to draw meaningful conclusions from the text (Holsti, 1969). In a study to measure critical thinking in group learning, Newman et al. (1995) count only the obvious examples and ignore "the intermediate shades of grey" in a message. Some research studies (e.g., Garrison, Anderson, & Archer, 2001; Rourke et al., 2001a; Swan, 2002), including this research, applied an analysis technique that predefines a set of categories containing latent variables and infers the manifest content of these variables.

6.6.2 Generalisability

Generalisability is another methodological issue found in case study research, as well as content analysis. According to Neuendorf (2002), the generalisability of findings is the extent to which the results can be extrapolated to other cases, settings, or times. However, generalising results from a single case study statistically can be problematic. Although the single case study is a common design for case study research (Yin, 1994) basically used to better understand the complexity of the case (Stake, 1995), a frequent criticism is its inability to provide a scientific generalisation. As Yin (1994) states, "a fatal flaw in doing case studies is to conceive of statistical generalization as the method of generalizing the results of the case. This is because cases are not 'sampling units' and should not be chosen for this reason" (p. 31). Nonetheless, generalisability in case study research can be achieved. Instead of the statistical generalisation of research findings, he suggests that case study research apply analytical generalisation, in which a previously developed theory can be used as a template to compare the empirical results of the case study. As he adds, "if two or more cases are shown to support the same theory, replication may be claimed" (Yin, 1994, p. 31).

Although using a single case study, this research attempted to lessen the extent of this concern by incorporating two units of analysis. In other words, conferencing messages from two different groups of students (regarded as "sub-cases") were analysed and compared. This process allowed the findings to be substantiated and provided a better insight into the study. Moreover, to obtain analytical generalisability, previously developed theories and the results from earlier research in this field were also used as an outline to compare the findings derived from this study.

6.6.3 Ethical considerations

Finally, and perhaps most importantly, were the ethical concerns relating to the research practice. Since content analysis is based on human subjects, such ethical considerations as data protection can have a significant impact on whether research using this technique can be accomplished (Archer et al., 2001). Miller and Bell (2002) also point out that "the practice of research is increasingly regarded as a risky enterprise in which the 'protection' of parties involved and issues of accountability come to the fore in written guidelines and contracts" (p. 65). For the most part, these requirements can separate some potential research participants from research work (Miller & Bell, 2002). The

ethical practice related to these concerns also affected the current research process considerably. Three levels of ethical considerations found in this research were at the institutional level, gatekeeper level, and research participant level. Data protection at the institutional level engaged with the policy of the institution. Some institutions, including universities, had a protocol that did not allow the researcher to conduct the research using internal materials and information (e.g., conferencing messages). The gatekeeper level, in addition, involved getting permission from the person who granted access to the research site. In most cases, the requests to gain access were rejected by the gatekeeper(s), usually the course director or tutors, who did not want to overwhelm the students with too much research that might distract them from the study. Finally, the data protection issue encountered in this research was involved at the participant level. This level was considered the most sensitive in the research process because it involved important issues (e.g., privacy) at an individual level, which the whole concept of data protection relied on.

Another ethical consideration, which was closely linked to the data protection issue, involved acquiring "informed consent"[22] (Frankfort-Nachmias & Nachmias, 1996). Gaining consent is not easy and can introduce a major concern to conducting research with participants in online environments. Herring (1996) insists that "to get all participants to consent to any project, no matter how unintrusive, is a difficult task. If the project is at all controversial, the chances that everyone will agree are virtually nil" (p. 161). According to ethical research practices, informed consent must be voluntary, without any compulsion or obligation (Jones, 1994). All key information about the research process, such as its purpose, potential risks, expected benefits, confidentiality, as well as the rights to withdraw from the research at any time, must be provided to the research participants.

To some degree, the issues of data protection and informed consent can be minimised by establishing personal relationships and trust with the person who has authority to give permission (e.g., programme director, administrator, leader, etc.) and the research participants themselves (see Allen, 1996). In the current research, the researcher met the

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[22] Informed consent is "the procedure in which individuals choose whether to participate in an investigation after being informed of facts that would be likely to influence their decision" (Diener & Crandall, 1978, p. 34)

programme director face-to-face in order to provide details of the research. The benefits of conducting the research, both to the field online learning and to this programme in particular, were discussed. After initial permission was granted, the researcher attended the first workshop, which provided a chance to meet the research participants and explain the research. Later, informed consent letters (see Appendix F) were sent out to obtain the students' permission to use their conferencing messages and the examination results. Because the researcher was not allowed to contact the participants directly during their period of learning, face-to-face sessions organised by the programme director were also utilised. These sessions provided opportunities to maintain communication and relationships with the participants throughout the research.

Finally, privacy was another important ethical concern of this research. According to Frankfort-Nachmias and Nachmias (1996), two common procedures to protect the privacy of research participants are to maintain their anonymity and to keep their data confidential. To maintain anonymity, fictitious names were used to keep students' identities anonymous throughout the research process. Although excerpts from online discussions were utilised to illustrate the findings, no real names were shown in the quotations. To maintain confidentiality, only the researcher was able to view and use the conferencing messages stored in the database. To enhance confidentiality, passwords were also applied to control access to the data.

6.7 Conclusion

The case study was the chosen methodology for this research to investigate social occurrences in OLCs. Equipped with the longitudinal approach, data from two one-year cohorts were collected with an aim to gain insights into the development of social presence and its relationship with other learning factors in such contexts. To address the two research questions put forward earlier, different strategies were employed. The first part of the main study used content analysis to explore the development of social presence in OLCs. Content analysis was a useful technique that allowed the researcher to capture social presence elements expressed by online participants in a meaningful way. Having said that, the analysis using this technique was also encountered by a number of difficulties. Archer et al. (2001) assert that this technique is "more often praised than practiced". The second part of the main study, in addition, examined social presence

further by applying various statistical techniques to investigate the relationship between social presence and other factors related to learning.

Apart from the strategy and methods used to carry out the research, this chapter has explained how the social presence template was modified to analyse social presence in OLCs. The details of the modified template and its categorisations were also described. Finally, the methodological considerations found in this research were also presented. Three major issues—subjectivity, generalisability, and ethics—related to the research process, particularly the content analysis procedures, were discussed. Based on these issues, such ethical practices as data protection and informed consent probably generated the most concern because they were closely linked to the validity and the generalisability of the findings. However, many attempts were made to reduce these impacts and enhance the quality of the research. It was hoped that the methodological framework presented in this chapter would provide functional implications for future work involving content analysis or other research using similar methods.

Over the next two chapters, the findings from the main study are provided. In Chapter 7, the results from the first part of the study that illustrates the development of social presence among online participants in OLCs are presented. In Chapter 8, the results from the second part of the study that shows the relationship between social presence and such factors as active participation and learning outcomes are reported.

CHAPTER 7

Main study (Part I)

In this chapter, the messages from computer conferencing among online participants, both students and tutors, from two different cohorts are analysed using content analysis. The findings from the study are presented. The chapter begins with the procedural framework used to conduct this part of the study. Subsequently, findings from content analysis are reported and discussed.

7.1 Introduction

This chapter investigates social presence among participants in online learning environments. In particular, it addresses the first research question: How does social presence develop in asynchronous text-based OLCs? At this stage, the messages from computer conferencing occurring among online students and tutors are used as the major source of data to study social presence in OLCs. They are examined, using content analysis with the aim of answering the above research question. In the following sections, content analysis and the approaches used to carry out the study are described. The criteria necessary to make the content analysis process more reliable and valid are also presented.

7.2 Method

7.2.1 Content analysis

Content analysis was selected as a major approach to examine social presence because it allowed the researcher to identify usage patterns and extrapolate trends from the conferencing messages. Content analysis is also a conceptual tool that can be used to explain a part of the real context (Krippendorff, 1980) in which social presence occurs. This technique is used by many researchers in online learning fields to investigate social occurrence among participants in online contexts (Garrison et al., 2000; Hara et al., 2000; Newman et al., 1995; Rourke et al., 2001a; Swan, 2002). The literature shows that

although content analysis can be frustrating and time-consuming, it is a useful way to capture the richness of social interaction (Hara et al., 2000).

Berelson (1952) defines content analysis as "a research technique for the objective, systematic, and quantitative description of the manifest content of communication" (p. 489). The technique involves "the use of replicable and valid methods for making specific inferences from text to other states or properties of its source" (Krippendorff, 1969, p. 70). Originally, content analysis was regarded as simply a method of word frequency analysis (see Berelson, 1952; Holsti, 1969). However, the concept of content analysis has recently expanded to include other procedures such as a qualitative evaluation of the content (Babbie, 1998). Many content analysis researchers employ a qualitative assessment of the materials for exploratory purposes or to provide them with greater confidence that the quantitative findings are valid (Neuman, 1997).

Content analysis has several advantages over other research techniques (Weber, 1990), and has many implications for this study. Content analysis is based entirely on texts or messages, which are considered fundamental aspects of social interaction. It can also be used to analyse textual materials qualitatively and quantitatively, and it allows the researcher to conduct the study over long periods. Unlike other methods, such as the survey and the interview, in which predefined items are applied, content analysis allows unstructured material to be analysed (Krippendorff, 1980). Finally, yet importantly, content analysis is an unobtrusive technique[23] in which participants are unaware that their communications are being examined[24] (Babbie, 1998; Krippendorff, 1980).

Applying content analysis to investigate social presence involved various processes. At the early stage of the study, permission was obtained verbally from both the programme

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[23] Webb, Campbell, Schwartz, and Sechrest (1966) introduced the term unobtrusive measure to refer to a data collection technique that does not involve direct information elicitation from research subjects. Content analysis is considered a preferred method as it helps avoid the problems caused by the presence of the researcher in the study.

[24] Although content analysis is a non-reactive measure, the request for consent from research participants may be reactive. This, to some extent, allows them to change their behaviour as they become aware that they are being studied. However, this issue was dealt with by extending the observation period and establishing personal relations and trust with the participants (Lee, 2000). The longitudinal approach applied to this research and face-to-face meetings during the workshops were utilised to minimise the problem.

director and the students in the programme to observe social interaction and communication among class participants. Before the coding process started, consent letters (see Appendix F) were sent out to gain official agreement from the students. The consent form and self-addressed envelope were mailed to students, and they were encouraged to return it by post in order to obtain their signatures. However, in case they were travelling, or a quicker and easier alternative was required, this process could be completed online. In the latter case, the students filled in an online form and submitted it electronically to the researcher in text file format. The researcher then sent an e-mail back to the respondents asking them to reconfirm their online consent for participation.

After consent was secured, the messages from computer conferencing posted by students in two different cohorts were downloaded and prepared before they were exported to ATLAS.ti® in a chronological threaded listing format. The software facilitated the integration of primary documents, quotations, codes, and memoranda into a single data structure called Hermeneutic Unit (HU) (Appendix I). It also allowed the interpretation and the analysis of data from conferencing messages to be conducted in a flexible, yet systematic way. As a part of the coding procedures, anonymity of the research participants was to be maintained. To achieve this objective, the participants' names in all threaded discussions were replaced by pseudonyms. However, genders were still identifiable for research purposes. Accordingly, male students were replaced by male names while female students were replaced by female names.

In this study, the conferencing messages (N=1296) from both students and tutors were coded separately module by module. Using a theoretically defined coding template developed from Rourke et al. (2001a) and Swan (2002), the messages were coded in relation to social presence indicators in each category (see Section 6.5.2). Subsequently, some of the messages were randomly selected and reviewed by the second coder. Coders' decisions were compared and discussed to ensure internal reliability. More details about the reliability are provided in the following section. Finally, the coded messages stored in the ATLAS.ti® database were ready for further analysis in a more meaningful way.

To investigate social presence development, the frequency of messages was prepared and exported to a statistical software package. Data between two different cohorts were

also compared to observe the similarities and differences. The coded messages analysed previously according to the social presence template were subsequently reviewed. They were used in order to provide an immediate understanding of how social presence developed among online participants in OLCs and to substantiate the quantitative findings from content analysis. An illustration of the online discussions also established some links between pieces of quantitative data in order to provide a clearer picture of social presence development in OLCs. Having said that, an effort was also made to go beyond a mere example of how social presence develops in such contexts. Some analytical comments were provided in order to create a level of understanding of social presence development and social occurrence in OLCs that quantitative data alone could not provide.

7.2.2 Criteria and the recording unit

7.2.2.1 Reliability

According to Krippendorff (1980), the three types of reliability in content analysis are stability, accuracy, and reproducibility. Stability is established when the same content is coded more than once by the same coder. A lack of stability may arise from a variety of factors, including ambiguities in the coding rules, texts, cognitive changes, or such other simple errors as entering the wrong code (Weber, 1990). In this study, the messages were coded and reviewed twice by the principle coder to ensure coding stability. The first review was conducted once the first coding process in each module was finished. The second review was performed after the messages in all modules were coded, thus ensuring the consistency of the entire coding process. Accuracy, the extent to which the classification is consistent to a set standard (Weber, 1990), was also achieved as the coding of online messages conformed to coding guidelines (see Appendix G).

Finally, reproducibility or intercoder reliability, the extent to which the analysis achieves the same results under different circumstances (e.g., with different coders), was obtained by "intercoder agreement"[25]. According to Weber (1990), this type of reliability is important in content analysis, as it measures the consistency of a shared understanding

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[25] Intercoder agreement, or coefficient of reliability (CR), is the ratio of coding agreements between two coders to the total number of coding decisions (Holsti, 1969). It is the simplest means and the most common method of intercoder reliability (Rourke et al., 2001a).

and meanings among coders. However, the literature suggests that many researchers still fail to assess the reliability of their coding or make data more reliable (Krippendorff, 1980). When disagreements occur, coders might resolve them by negotiating or requesting the authority of the principal coder, who might have a prejudice (Krippendorff, 1980). Therefore, in this study, intercoder agreement before and after the disagreements between the two coders were calculated and reported separately. Holsti (1969) provides a formula for calculating intercoder agreement as:

$$\frac{2M}{N_1 + N_2}$$

where:

M = the number of coding decisions on which the two coders agree
N_1 = the number of coding decisions made by coder 1
N_2 = the number of coding decisions made by coder 2

In the current study, approximately 10 percent (N=120) of the conferencing messages were randomly selected for the reliability test. According to Neuendorf (2002), there is no predefined standard for sub-sample size, but a rough guideline in social science research is 10 to 20 percent of the total sample (see Wimmer & Dominick, 1997). In the first cohort, the intercoder agreement was 0.96 (compared to 0.89 before the disagreements were resolved). In the second cohort the intercoder agreement was 0.95 (compared to 0.88 before the disagreements were resolved). Although no common measure for intercoder reliability has been established, reliability figures above 0.80 are considered acceptable, while such figures in a new research area can be lower (Riffe, Lacy, & Fico, 1998).

7.2.2.2 Validity

The term validity has been used in many different ways. Essentially, validity is about asking the question, "are we measuring what we want to measure?" (Neuendorf, 2002, p. 112). Particularly related to content analysis is the validity of the category, or the classification scheme, and its variables used to analyse the content of communication (e.g., texts) (Weber, 1990). Various types of validity have been described in content analysis. To a certain extent, three types of validity—content validity, construct validity, and semantic validity—were established in this study.

Established through the judgement of the investigator, content validity, or face validity, is the degree to which an instrument appears to measure what it is supposed to measure (Holsti, 1969). Put more simply, it relies on the subjective assessment of the researcher regarding the validity of a measuring instrument (Frankfort-Nachmias & Nachmias, 1996). In the current study, this type of validity was established because the instrument (i.e., coding template) seemed to measure what it was intended to measure (i.e., social presence). It was also believed that the template reflected and adequately represented this specific domain of content.

Construct validity involves the extent to which the measuring instrument is related to a general theoretical framework regarding the concept being measured (Carmines & Zeller, 1979). According to Frankfort-Nachmias and Nachmias (1996), researchers establish construct validity "in order to determine whether the instrument is tied to the concepts and theoretical assumptions they are employing" (p. 168). In this study, an attempt was made to obtain this validity by adopting a theoretically derived instrument developed by previous researchers in this area (e.g., Rourke et al., 2001a; Swan, 2002). Extensive review of the literature in the area of social presence was also performed with the aim of improving the construct validity of the instrument.

Semantic validity, finally, is indicated by an agreement in the details of the classification scheme in terms of semantic similarity (Krippendorff, 1980). In other words, semantic validity is associated with meaning reconstruction and is expressed in the suitability of the categories, definitions, key examples, and coding rules (Titscher, Meyer, Wodak, & Vetter, 2003). According to Krippendorff (1980), semantic validity is established when persons familiar with the language and texts examine the content of the categories (e.g., variables) and are in agreement in terms of meanings or connotations. Although semantic validity was rather difficult to establish because words and definitions are sometimes ambiguous (Weber, 1990), an attempt was also made to achieve it. In the current study, the coding template was reviewed by a researcher who had experience in content and discourse analysis. Agreement between the two researchers was made concerning meanings and connotations of the categories described in the template. In order to enhance semantic validity, the coding guidelines (see Appendix G) were also produced, thus providing helpful instructions and samples for the coding procedure.

7.2.2.3 Recording units

Holsti (1969) describes a recording unit as "the specific segment of content that is characterized by placing it in a given category" (p. 116). Recording units can vary from such a small unit as a word or a sentence to such larger units as a paragraph or the whole text. Each recording unit has its own advantages, and there are still some debates on what type of unit should be applied for content analysis.

A word is generally the smallest and the safest recording unit of text (Holsti, 1969; Krippendorff, 1980). However, a word unit may be too small to capture the whole idea of the text and can produce a very large number of cases. A larger syntactical unit, such as a sentence, is more reliable (see Hillman, 1999). However, according to Rourke et al. (2001b), using a sentence as a recording unit presents some problems in the coding process. First, it involves an additional subjective step in the coding process because the coder(s) has to interpret the whole message before transforming it into sentences. Second, it can produce a number of cases from a long message. Some other researchers (e.g., Hara et al., 2000) use a slightly larger recording unit, such as a paragraph, to avoid this problem. A paragraph can reduce the number of cases compared to such a smaller unit as a sentence. However, the use of a paragraph can be problematic. As noted by Rourke et al. (2001b), "often, a full line of space or a tab was used for purposes other than delimiting a single coherent and unified idea accompanied by a group of supporting sentences. And, once the syntactical criteria are lost, the definition of the unit as 'paragraph' becomes meaningless".

Rather than a small syntactical unit, some researchers (e.g., Marttunen, 1997; Mower, 1996) use a message as the recording unit. Rourke and Anderson (2002b) report that a message unit is the most practical because it is objectively identifiable, produces manageable cases, and is determined by the message author. Finally, some researchers (e.g., Henri, 1991; Newman et al., 1995) apply a thematic unit to the content analysis process. According to Krippendorff (1980), a thematic unit is identified by its "correspondence to a particular structural definition of the content of narratives, explanations, or interpretations" (p. 62). Although it is flexible and allows coders to classify the content in a natural form (Rourke et al., 2001a), it requires much understanding of the source (Krippendorff, 1980) and is considerably time consuming (Holsti, 1969). Krippendorff (1980) also notes that it is difficult to identify the themes

reliably. As he points out, "because of the long chains of cognitive operations involved in the identification of thematic units, even carefully trained observers can be easily led astray" (p. 64).

This study attempted to combine the advantages from both message and thematic units. In the coding process, each individual message derived from the computer conferencing among online participants was regarded as a recording unit. However, more than one social presence indicator (e.g., emotion, humour, self-disclosure, etc.) could be assigned to the message based on the theme found[26]. By doing this, the researcher was able to utilise the features of both recording units that could enhance the process of content analysis. In other words, the message unit was statistically identifiable and reliable while the thematic unit allowed the researcher to capture social presence content in a flexible and practical manner.

7.3 General findings

At this stage, descriptive statistics were performed to obtain general findings from computer conferencing among online participants, both students and tutors. A total of 548 messages in the first cohort and 748 messages in the second cohort were analysed and compared. To some extent, similar patterns of online participation were found in both cohorts. Based on the findings, online participants contributed the most in the first module as shown in Figure 6. However, the number of messages declined and reached the lowest point in the last module.

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[26] In the coding process, more than one social presence indicator could be identified within the same message. However, two or more repetitions of the same indicator found in each message were counted only once. Finally, the total number of social presence indicators found in the messages throughout the module was compiled and analysed statistically.

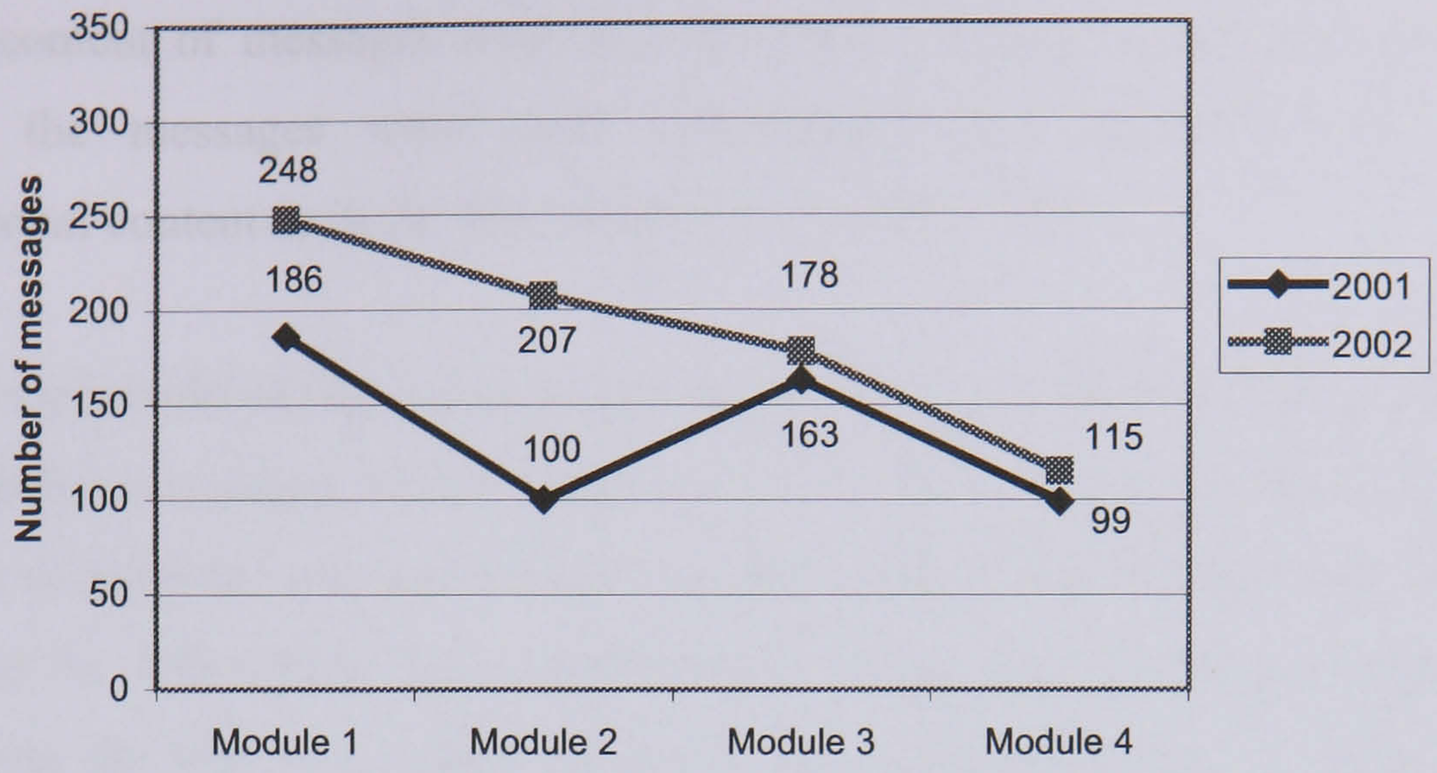

Figure 6 Number of messages

Although the number of messages in the first module was the highest, the findings showed that the number of words per message in the first module was the lowest compared to the other modules (Figure 7). This demonstrated that participants in the OLCs tended to post more, but shorter, messages in the first module and post fewer, but longer, messages in the following modules.

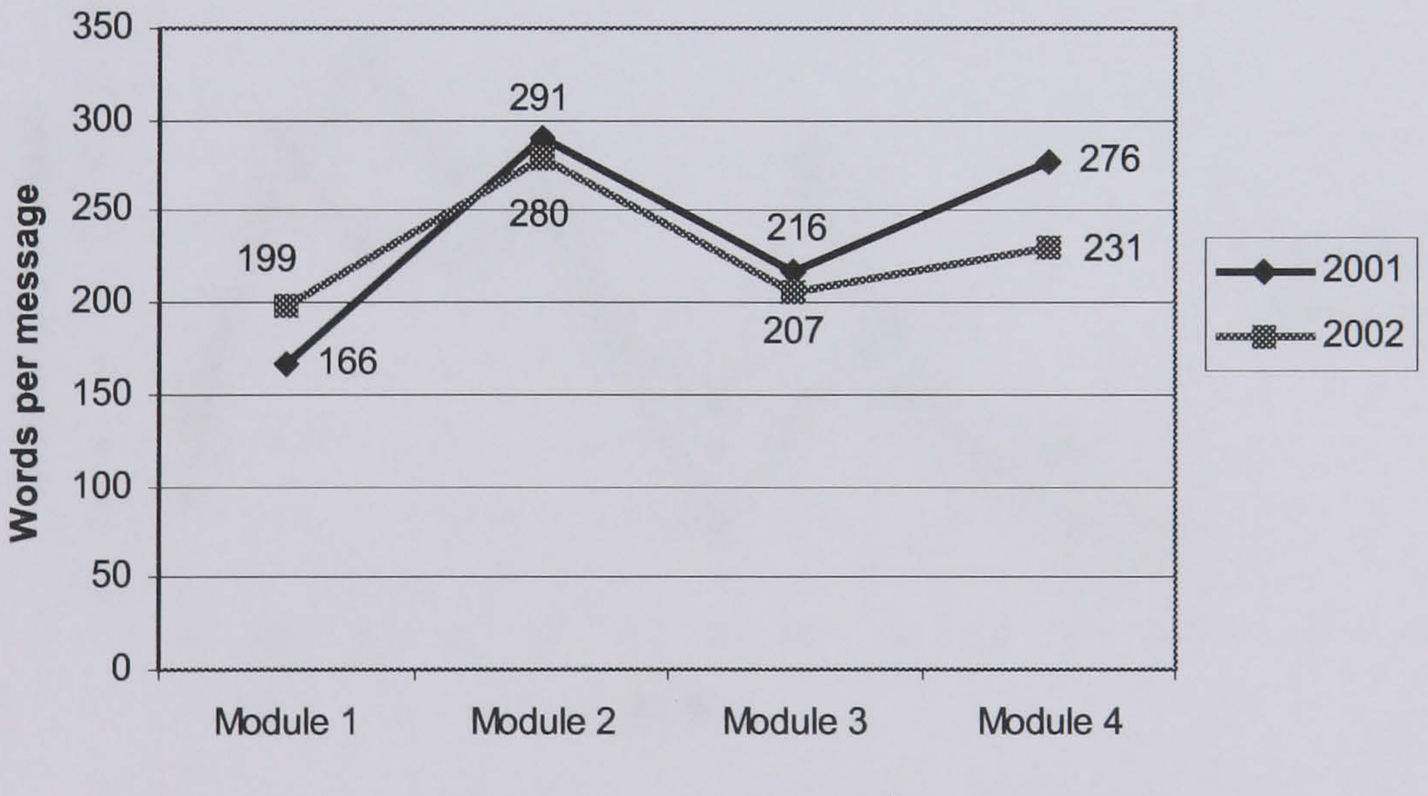

Figure 7 Number of words per message

In this study, online participants were likely to post frequent short messages in the first module for many reasons. First, they wanted to establish their social identity in the community or re-establish it after they met in the first workshop. Second, they took this opportunity to get started and to create a warm and welcoming learning environment. A review of the conferencing messages from the two cohorts indicated that not only had

the number and the length of messages changed over time, the development of thought shown in content of messages seemed to be more complex in the later modules. In particular, the messages were more task-oriented and did not show as much socioemotional content as in the first module (see Section 7.5).

The number of conferencing messages posted by online participants in each module was analysed further according to their roles in OLCs. Based on the results of the analysis, the number of students' messages during the first week of each module was comparably low (Figure 8). Afterwards, their contributions to the class discussions became more frequent over the next few weeks. However, the participation rate of online students started dropping from week 5 until week 7 when the residential workshop took place. After the workshop, the number of messages among online students became higher as they continued the discussions of some topics from the workshop. From week 9, again, the number of messages declined steadily because the students had to submit their assignments around week 10 and take the final examination in week 12, when the participation rate was the lowest. Similar patterns of postings by online students in the two cohorts were found.

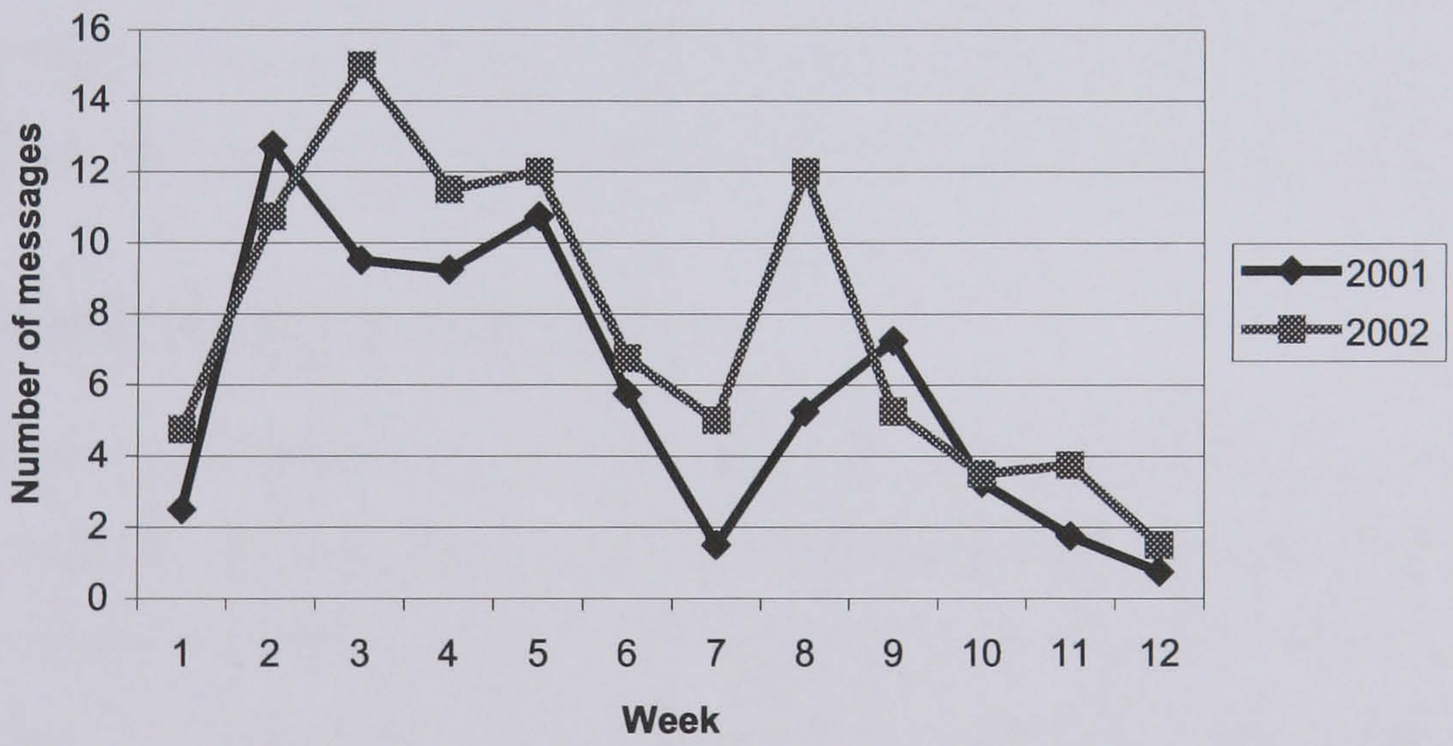

Figure 8 Average number of students' messages by week

For online tutors (Figure 9), some contributions from a module leader and module tutors before each module started could be found (week 0). Most of the messages were not content-related, such as module introduction, module design (e.g., examination date, group members), welcome messages, and so forth. Just as in the case of the students, the number of messages by tutors was moderately low in the first week of each module and

became much higher in the second or third week. Similarly, the contributions by online tutors dropped around week 6 and 7 when the workshop was about to take place.

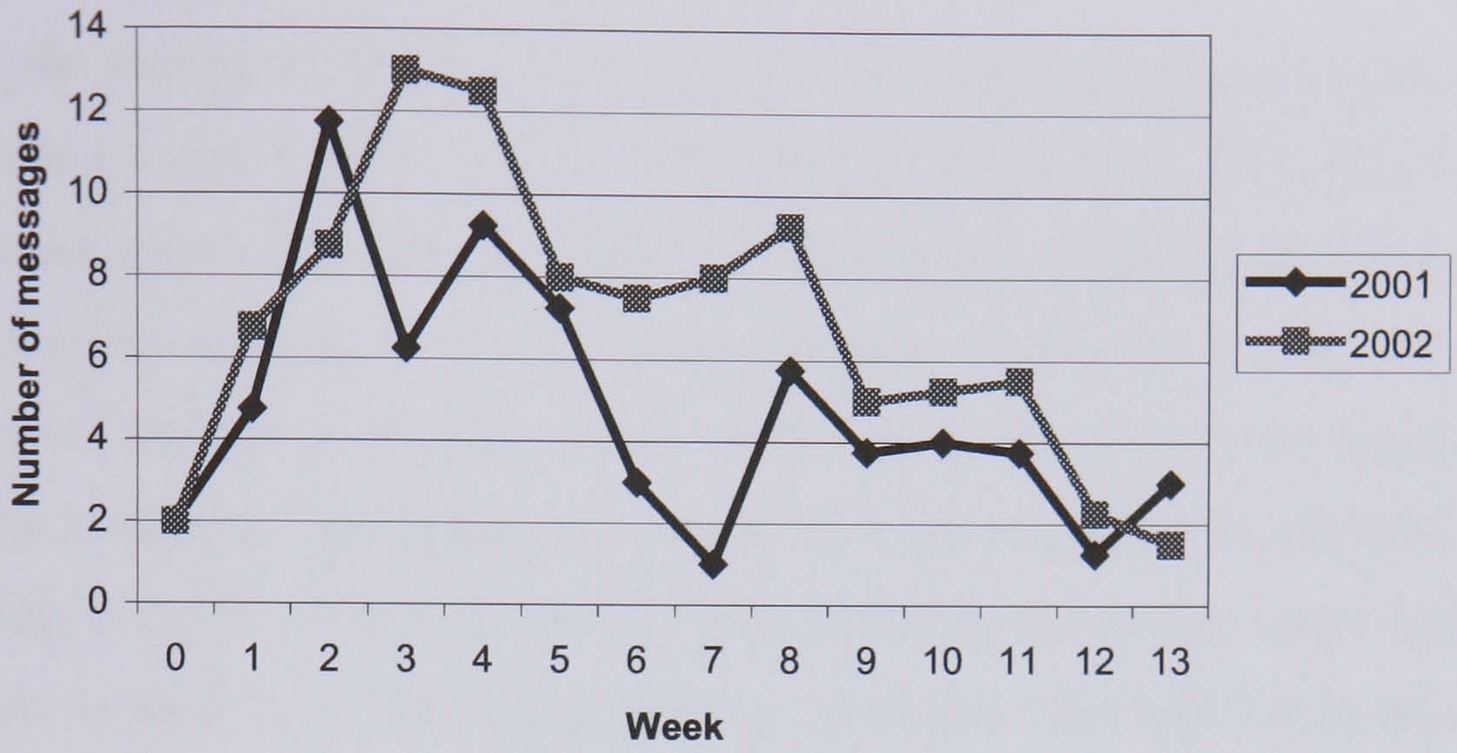

Figure 9 Average number of tutors' messages by week

The number of messages by tutors was back to normal after the workshop but gradually declined again until the end of module in week 12. Unlike in the case of the students, however, there were still some messages posted by online tutors after the module finished (week 13). The message topics found at this period included examination results, information about the next module, and requests to complete a module survey. Similar patterns of contributions by online tutors were found in both cohorts although the average number of conferencing messages in the second cohort was slightly higher.

7.4 Content analysis findings

In this section, the results from the quantitative content analysis of the conferencing messages posted by online students in the two different cohorts are reported (see Section 7.4.1). The total number of students' messages in the first cohort (N=281) and the second cohort (N=367) were analysed separately according to the modified social presence template (see Section 6.5.2). Based on the template, three social presence categories—affective, cohesive, and interactive responses—were further broken down into smaller items, called indicators, which reflected social presence elements in text-based online communication. In the coding process, the content in each message was assigned in relation to as many social presence indicators as necessary. Therefore, it was possible that a message could contain more than one social presence indicator. Moreover, because the number of students in each module varied from one module to

another, the figures are reported in percentages[27] in order to compare the findings across modules. This was a useful way to compare the results obtained from two units of analysis in order to generalise the findings.

In addition, the findings from the analysis of the conferencing messages posted by online tutors are also presented (see Section 7.4.2). The messages in the first cohort (N=267) and the second cohort (N=381) were analysed and coded according to the same social presence template as that used for online students. However, the social presence development of online tutors could not be observed because the tutors usually varied from module to module throughout the cohort. Yet, the analysis still provided a useful understanding in terms of the patterns of social presence that online tutors projected in each module. In each of the following sections (Sections 7.4.1 and 7.4.2), an overview of all three social presence categories is offered followed by the details of social presence indicators in each category.

7.4.1 Social presence: Online students

This section describes the findings from the analysis of online discussions among students in the 2001 and 2002 cohorts. The expression of social presence by online students in each module classified by three social presence categories according to the template is presented (Figure 10). First, the Mann-Whitney U test was conducted to observe the differences between the two cohorts in the level of social presence usage across modules. The test demonstrated no significant differences in each social presence category (see Table 39, Appendix J). Similar patterns of social presence in each module were also found in both cohorts. Apart from the first module, in which affective responses were higher, cohesive responses were usually the most frequently used social presence category followed by interactive responses.

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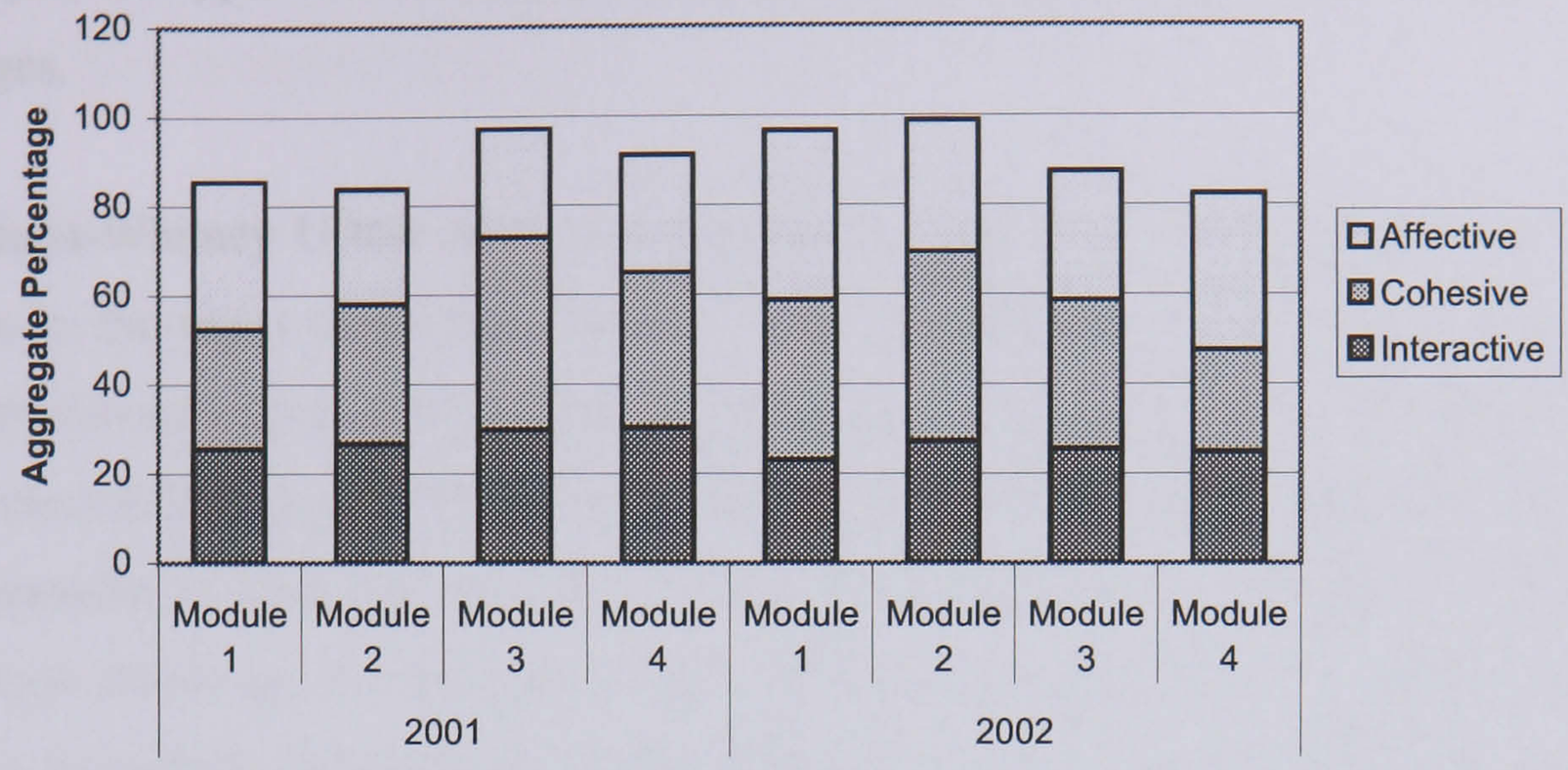
[27] Since multiple social presence indicators could be expressed by an online participant within a single message, the aggregate percentages shown in the figures could exceed 100 percent.



Note: Aggregate percentages shown in the figures may exceed 100% due to multiple indicators found within a single message.

Figure 10 Student social presence by category

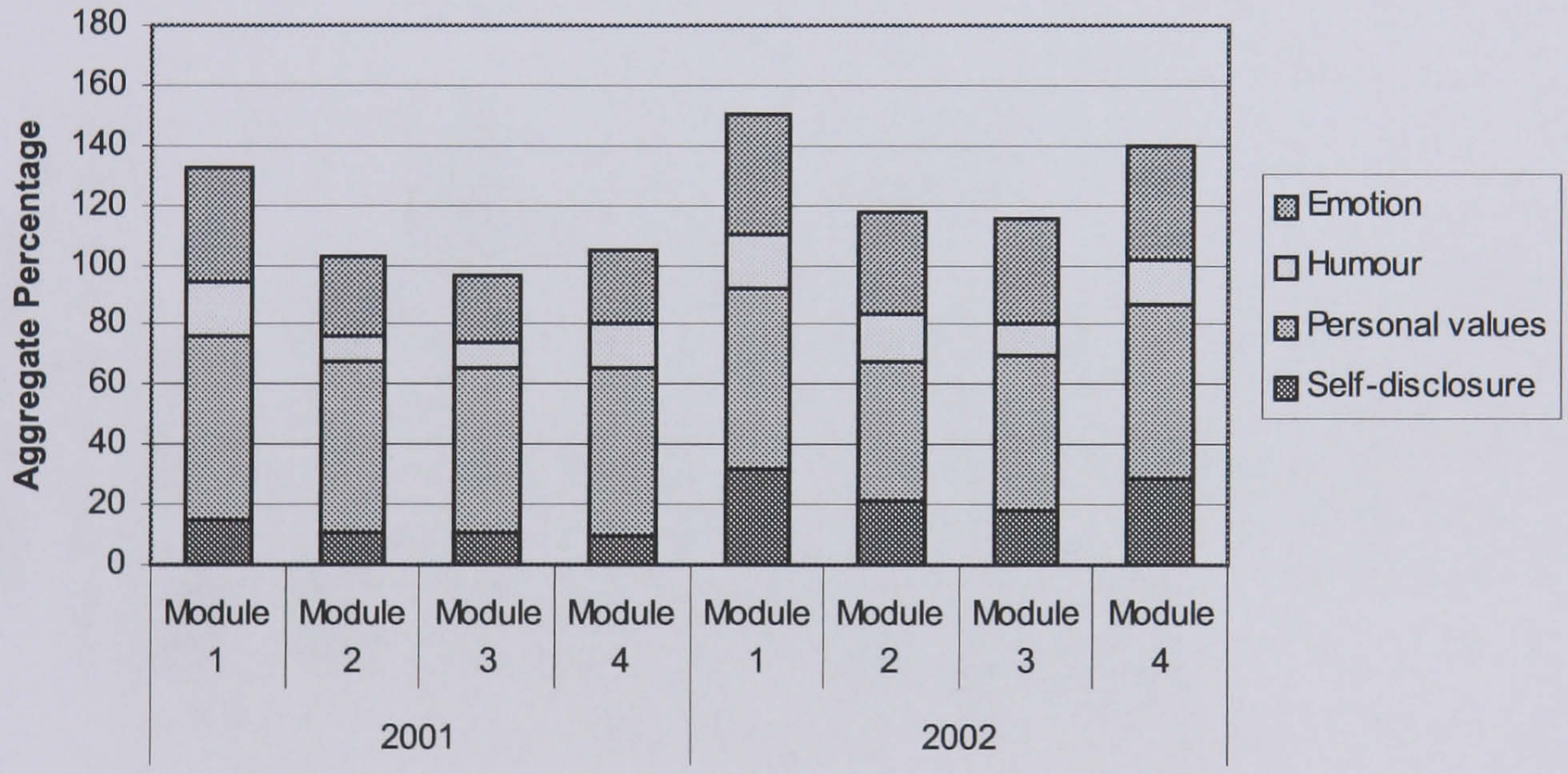
When investigating the expression of social presence across modules, the findings from the two cohorts showed that affective responses were the highest in the first module and declined over the next two modules before slightly increasing in the last module of the cohorts (see Section 7.4.1.1). Unlike affective responses, cohesive responses among online students seemed to require more time to develop. The findings from the first cohort revealed that cohesive responses were noticeably higher in the third module and then declined. Similar patterns were found in the second cohort, although participants in this cohort seemed to create their sense of community and social cohesion faster (see Section 7.4.2.2). Finally, the findings from the content analysis revealed that interactive responses by online students were slightly lower in the first module. The usage, however, became more common and rather constant across modules throughout the cohorts (see Section 7.4.1.3). In the next sections, each social presence category is described further to see how social presence indicators were used in each module and how they developed across time.

7.4.1.1 Affective responses

Figure 11 illustrates affective responses exchanged between students in the 2001 and 2002 cohorts showing the aggregate percentage of affective indicators to the total number of messages in each module. It also describes the expression of affective communication by online students across modules. According to the coding template, four indicators—emotion, humour, personal values, and self-disclosure—were employed

to analyse this type of communication expressed by online students in the conferencing messages.

The Mann-Whitney U test showed no significant differences between students in both cohorts in the terms of emotion, humour, and personal values. However, a significant difference in self-disclosure was found. Students in the second cohort seemed to disclose their vulnerabilities and personal stories more than those in the first cohort did (see Table 40, Appendix J). This was possibly because of the characters of the students attending the cohort. However, the findings revealed similar patterns of affective responses in each module throughout both cohorts. Clearly, personal values were the most frequently used indicator in every module followed by emotion. Self-disclosure and humour, in contrast, were not common social presence indicators and were hardly used by online students in either cohort.



Note: Aggregate percentages shown in the figures may exceed 100% due to multiple indicators found within a single message.

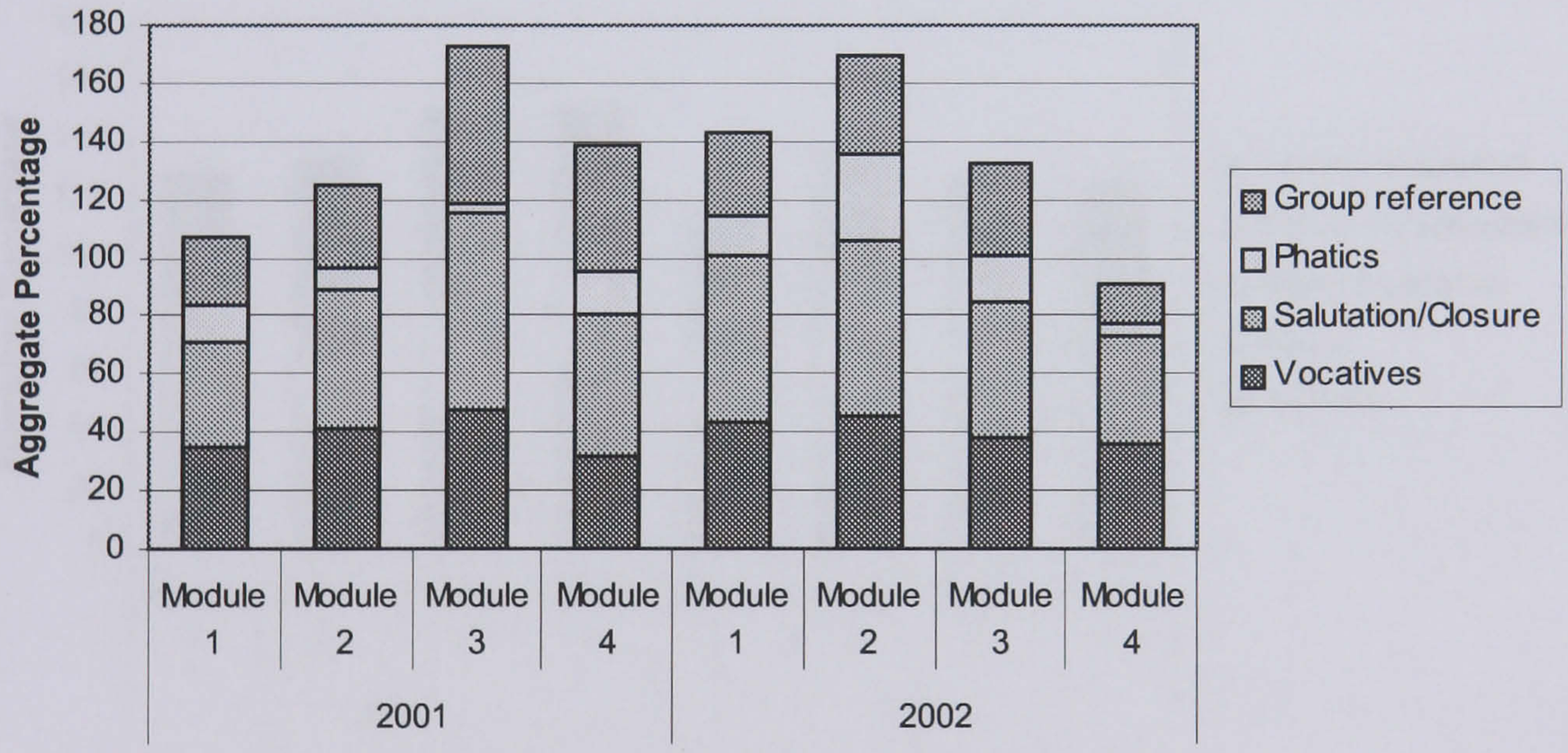
Figure 11 Affective responses of students

When examining the expression of affective indicators across modules, a similar development between the two cohorts was found. The use of personal values by online students was highest in the first module. Although its usage declined slightly over the next modules, it seemed that personal values were used regularly to convey personal views and ideas throughout the cohort. Likewise, the use of other affective indicators was also highest in the first module when students used them to create a warm,

welcoming learning environment and to establish their social identity in the class. However, these indicators declined subsequently over the next modules.

7.4.1.2 Cohesive responses

Figure 12 illustrates cohesive responses expressed by online students in the two cohorts. It shows the patterns of the cohesive responses used in each module and the development of this social presence category across modules. Four indicators—group reference, phatics, salutation/closure, and vocatives—were used to classify such responses found in online discussions. No significant differences between the two groups were found in terms of the cohesive response usage (see Table 41, Appendix J). The analysis of conferencing messages also revealed similar patterns of these responses in each module throughout the cohorts. Salutation/closure was the most frequently used indicator while phatics, a communication used to create an atmosphere rather than to impart information, was the least frequently used indicator employed by online students.



Note: Aggregate percentages shown in the figures may exceed 100% due to multiple indicators found within a single message.

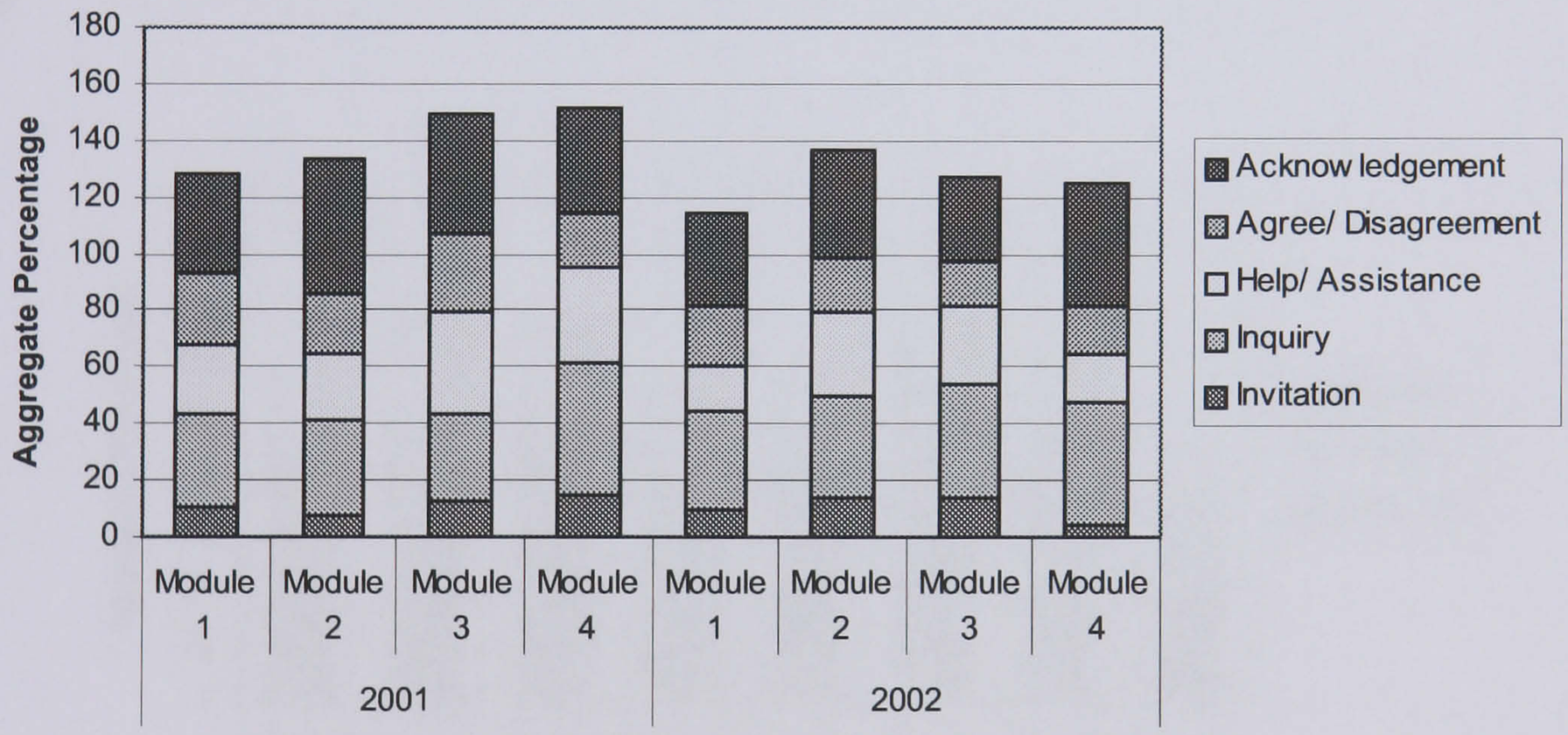
Figure 12 Cohesive responses of students

When examining the expression of cohesive responses across modules, the findings showed that such cohesive indicators as salutation/closure constantly increased over time and declined after their peak levels. The other cohesive indicators, such as vocatives, a noun or noun phrase used to address other people by name, and group references among online students, also needed some time to develop. A similar development process was

found in both cohorts, but cohesive communication seemed to develop faster among online students in the second cohort.

7.4.1.3 Interactive responses

Figure 13 illustrates interactive responses from conferencing messages posted by online students in two different cohorts. Again, it shows the patterns of interactive responses used in each module and the development of this social presence category over time. Five indicators—acknowledgement, agreement/disagreement, help/assistance, inquiry, and invitation—were employed to analyse these responses in online discussions. No significant differences between the two groups were found in terms of the interactive response usage (see Table 42, Appendix J). Content analysis also revealed similar patterns of these responses in each module. Acknowledgement and inquiry seemed to be the most frequently used indicators. In contrast, the use of invitation by online students was least frequent in every module throughout the cohorts.



Note: Aggregate percentages shown in the figures may exceed 100% due to multiple indicators found within a single message.

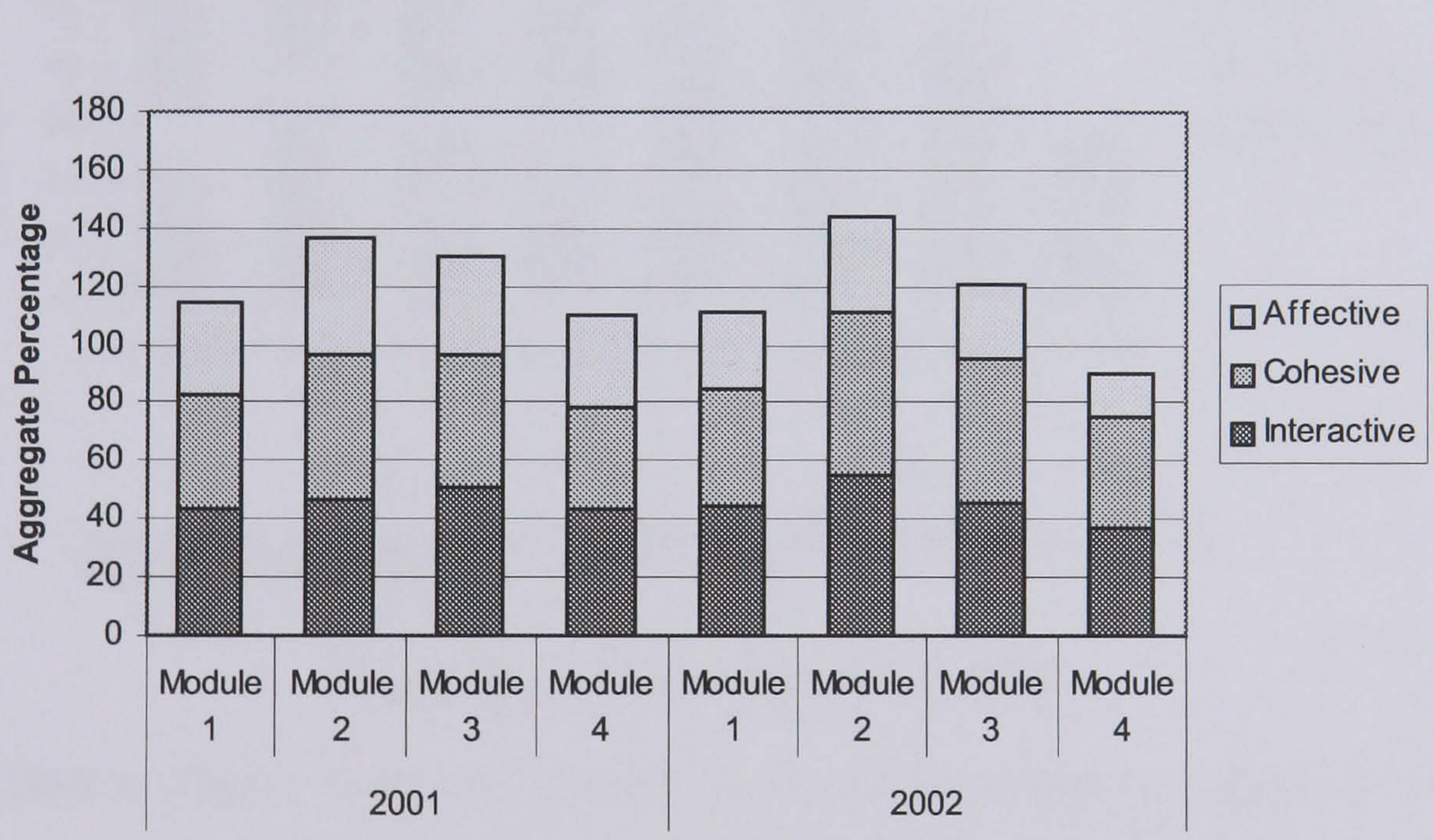
Figure 13 Interactive responses of students

Unlike affective and cohesive responses, the findings from both cohorts showed no sign of consistency in development processes when examining the expression of interactive responses across modules.

7.4.2 Social presence: Online tutors

This section describes the findings from the analysis of conferencing messages posted by online tutors in both the 2001 and 2002 cohorts. The total messages in the first cohort (N=267) and the second cohort (N=381) were coded according to the same social presence template used in the previous section. Although the development of social presence could not be examined due to the change of tutors across modules, the patterns of social presence expression in each module were observed. As with online students, three social presence categories—affective, cohesive, and interactive responses—were used to classify social presence elements expressed by online tutors in text-based communication.

Figure 14 shows the expression of social presence by online tutors in each module from both cohorts. First, the Wilcoxon Signed Rank test was conducted to observe the differences between the two cohorts in the level of social presence usage. No significant differences in any of the social presence categories were found (see Table 43, Appendix K).



Note: Aggregate percentages shown in the figures may exceed 100% due to multiple indicators found within a single message.

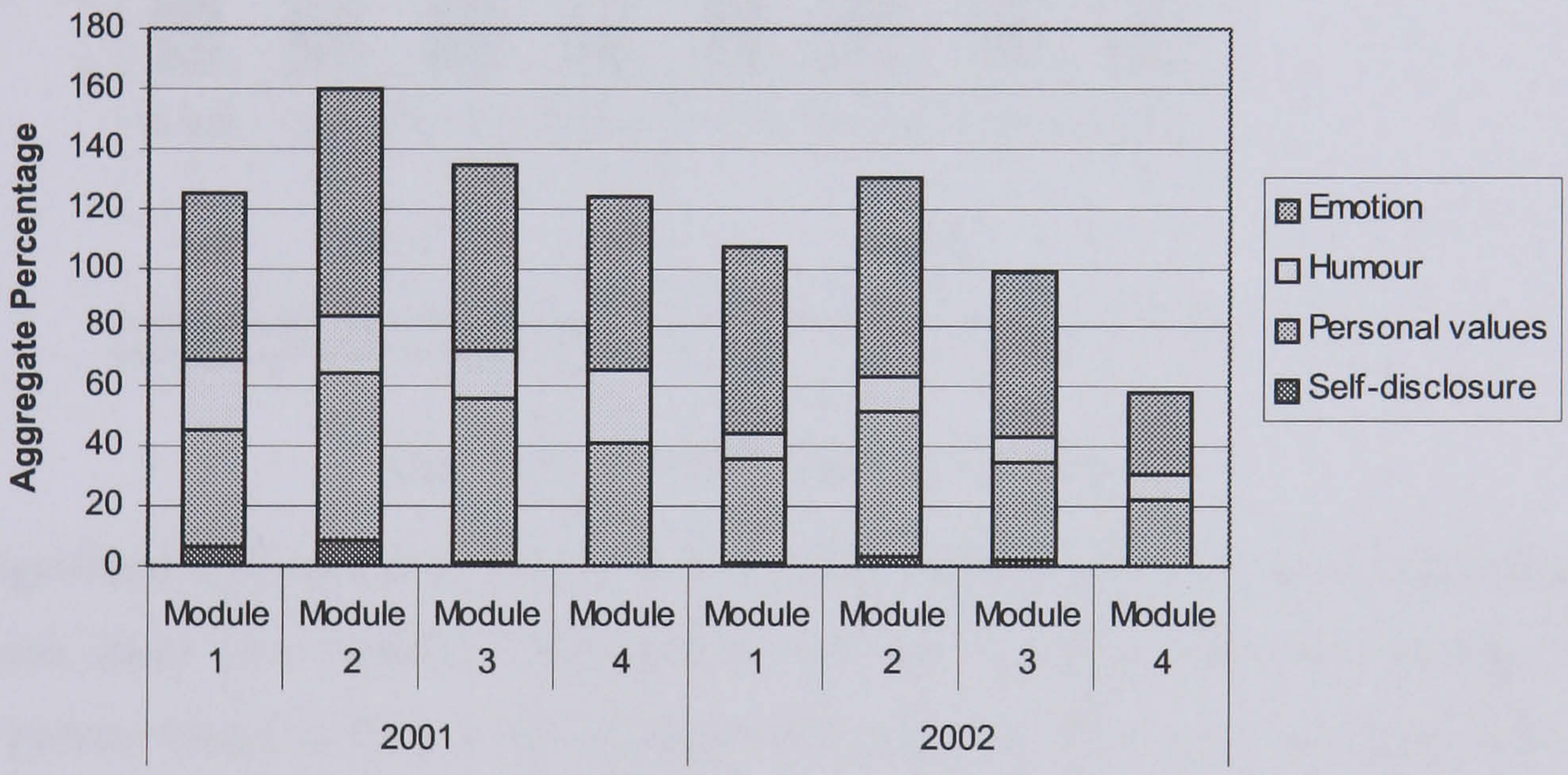
Figure 14 Tutor social presence by category

The findings also revealed quite similar patterns of social presence expressions by online tutors in each module. Interactive responses seemed to be the most frequently used social presence category, followed by cohesive responses with about the same level of usage in every module throughout the cohorts. Affective responses, in contrast, were the least

frequently used social presence category by the tutors in each module. The following sections provide a clearer picture of how online tutors projected their social presence in a text-based learning environment.

7.4.2.1 Affective responses

Like students in this programme, online tutors also expressed their social presence through affective communication using such a text-based medium as computer conferencing. Figure 15 illustrates affective responses found in conferencing messages posted by online tutors in the two cohorts. The figure shows the aggregate percentage of affective indicators to the total number of messages posted in each module. Four indicators—emotion, humour, personal values, and self-disclosure—were used to analyse affective responses in online discussions.



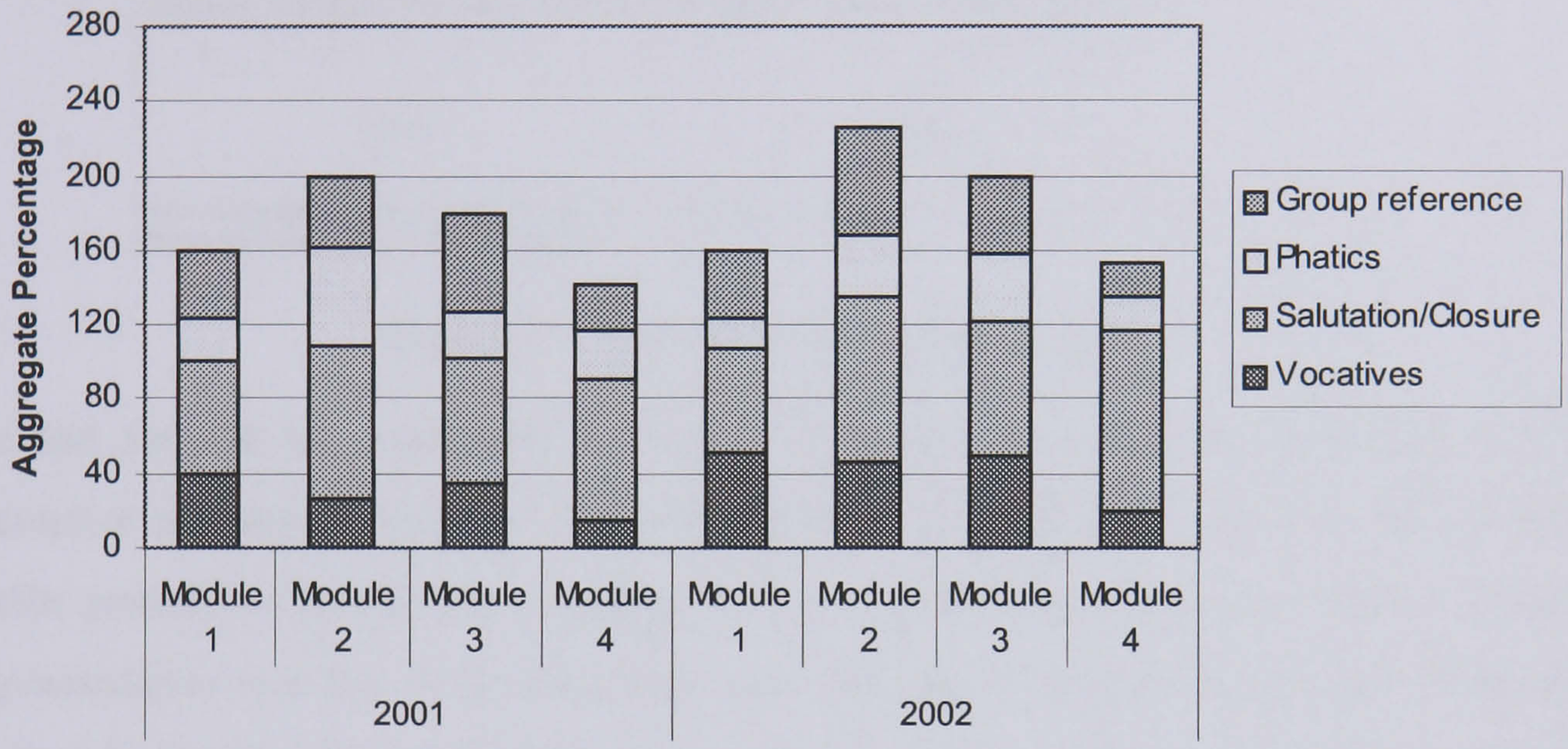
Note: Aggregate percentages shown in the figures may exceed 100% due to multiple indicators found within a single message.

Figure 15 Affective responses of tutors

The Wilcoxon Signed Rank test showed no significant differences between the two groups in terms of the affective response usage (see Table 44, Appendix K). The results from content analysis also revealed similar patterns of affective responses expressed by online tutors in each module throughout the cohorts. Emotion was the most frequently used affective indicator, followed by personal values, humour, and self-disclosure. Based on these findings, it seemed that online tutors usually imparted emotion and feelings in their messages to establish rapport with their students and create a positive learning environment.

7.4.2.2 Cohesive responses

Figure 16 illustrates cohesive responses found in conferencing messages posted by online tutors in both cohorts. According to the social presence template described previously, four indicators—group reference, phatics, salutation/closure, and vocatives—were used to classify cohesive responses expressed by online tutors in text-based online discussions.



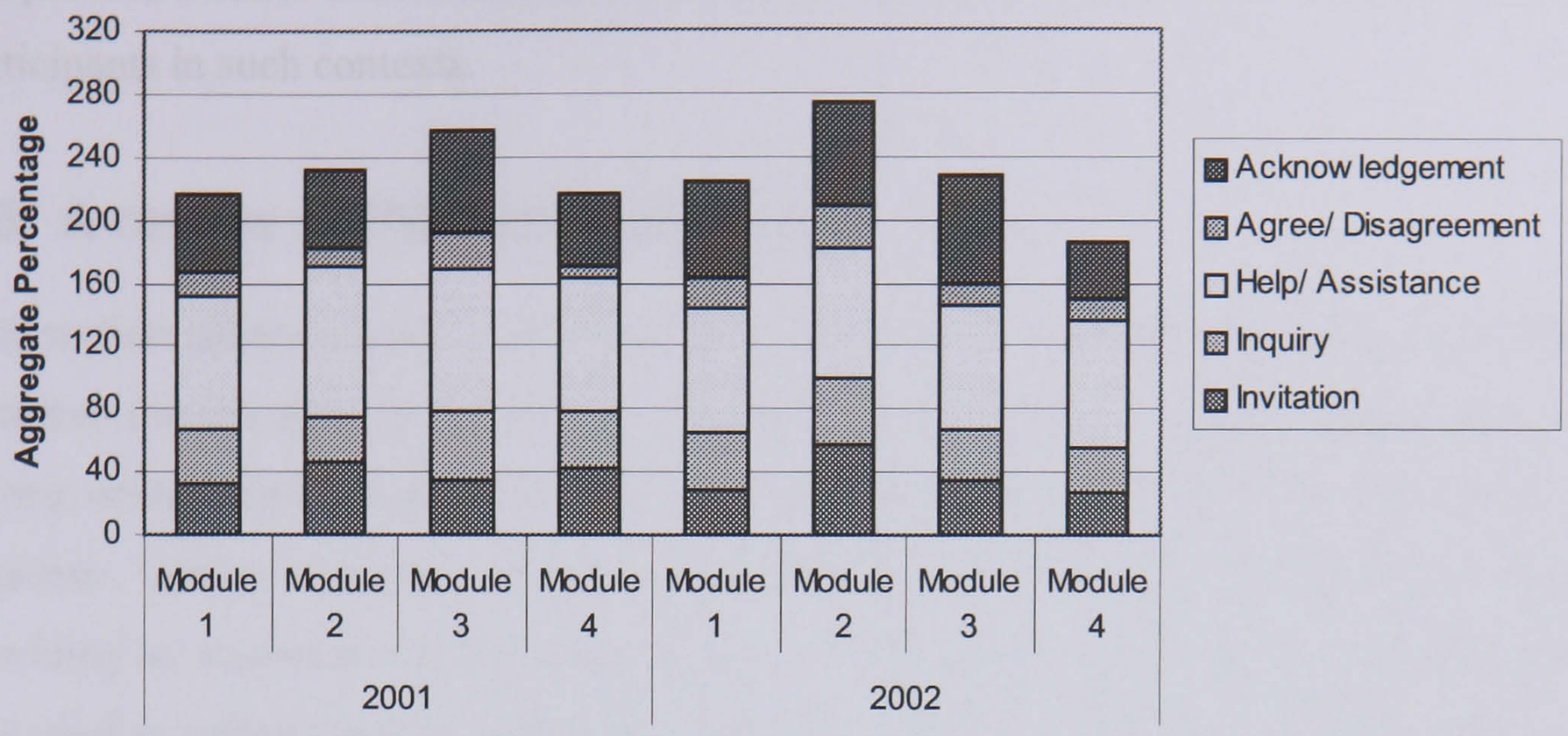
Note: Aggregate percentages shown in the figures may exceed 100% due to multiple indicators found within a single message.

Figure 16 Cohesive responses of tutors

No significant differences between the two groups were found in terms of the cohesive response usage (see Table 45, Appendix K). However, unlike affective responses, the only pattern found in this social presence category was the use of salutation/closure. Based on content analysis, salutation/closure was the most frequently used cohesive indicator in every module throughout the cohorts. Apart from this indicator, the level of usage of the other cohesive indicators by online tutors seemed to vary from module to module.

7.4.2.3 Interactive responses

Figure 17 shows the use of interactive responses by online tutors. Five indicators—acknowledgement, agreement/disagreement, help/assistance, inquiry, and invitation—were employed to analyse interactive responses from the conferencing messages of online tutors.



Note: Aggregate percentages shown in the figures may exceed 100% due to multiple indicators found within a single message.

Figure 17 Interactive responses of tutors

The test showed no significant differences between the two cohorts in terms of the interactive response usage (see Table 46, Appendix K). Content analysis also revealed similar patterns of interactive responses in each module throughout the cohorts. Clearly, help/assistance was the most frequently used indicator, followed by acknowledgement. Agreement/disagreement, in contrast, was the least frequently used indicator in this social presence category.

To summarise, social presence indicators expressed by both students and tutors were investigated. For the online students, the content analysis of both cohorts seemed to show quite similar patterns of social presence indicators in each category. In addition to interactive responses, evidence of the development of social presence was found. Although this development could not be observed from the tutors' messages, patterns of social presence expression by online tutors were found. These patterns were supported by similar findings from the second cohort. There were both similarities and differences between students and tutors in terms of social presence patterns. For example, such affective indicators as humour and self-disclosure were not common for either of them. The use of salutation/closure seemed to be the most basic function to convey their sense of presence and maintain group cohesion. However, such interactive indicators as inquiry and help/assistance were used differently based on their roles in OLCs. In the following section, the qualitative data derived from online discussions helps illustrate

and provide a better understanding of how social presence indicators were used by online participants in such contexts.

7.5 A review of the qualitative data

This section presents some quotes extracted from the conferencing messages (N=1296) from two cohorts with an aim to show how social presence was conveyed and developed among online participants[28] in an actual OLC. In particular, these excerpts were used to illustrate various scenarios in which social presence indicators were applied, thus providing an immediate understanding of the social presence in this context. They were also used to substantiate the quantitative findings from the previous section. In addition, they provided some information that allowed a clearer view of social presence in OLCs to be developed. Partly, this section aims to go beyond a simple illustration. Some analytical comments were also made in order to generate a level of knowledge and understanding of social presence that could not obtain from the quantitative data alone.

7.5.1 Social presence: Online students

The development of online communities is one of the most important factors that maintain appropriate levels of social interaction and help students achieve successful learning outcomes. The early phase of the OLC development process is very critical (Palloff & Pratt, 1999). Online participants should pay a great deal of attention to this stage and put effort into establishing a solid foundation for the later stages. In many online programmes, the face-to-face session can be used to support the development of OLCs (Harasim et al., 2001). A workshop, or a certain type of face-to-face session, provides an opportunity to develop social rapport and accelerate the development of social presence among participants in an online class. The following is an example of a student's message posted after the residential workshop. It can be seen that social presence, especially affective responses (e.g., emotion and humour), is found throughout the message. This created a friendly learning environment and helped participants in OLCs develop a social connection among them.

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[28] The names of the participants, both students and tutors, were already replaced by fictitious names in order to maintain their privacy required by the Data Protection Act 1998. The Data Protection Act 1998 can be found at http://www.informationcommissioner.gov.uk/ (12 April 2003)

Dear All! First of all, I'd like to say a big thank you to the organizers and lecturers of the workshop for the wonderful job they did. I have re-discovered how important the personal contacts are. Without the discussion forum, there would never have developed such a "spicy" debate over the usefulness of user fees. Please note that the photo where Sean is head by head with Jack was taken before that class. I really enjoyed the time spent with you. I missed those who were not present and strongly advise them to come to the next in-residency. I'll try to up-load a few photos, not too much in fact, but I promise that next time nobody will escape. Somehow, British Airways has found out that Health Econ students are going to use their flights and placed an article in their traveller journal about the "value of life". It's a nice one, so I put it for all of you who feel that the mandatory reading is not enough. See you soon! James

(James: Student)

Affective responses are important for the creation of a positive learning climate at the beginning of community building process (Polhemus et al., 2001). The quantitative findings from the previous section demonstrated that affective responses were the highest in the first module. These results were supported by the conferencing messages that reflected the meaning of social rapport among people at this stage. The messages posted by online students at the start of the module were less likely to involve learning topics. Rather, most of them were aimed at 'breaking the ice' and establishing social connections among participants before serious discussions began. Therefore, content-related messages among online participants were uncommon at this stage. The messages were reasonably short and the ideas were not very complex (see Section 7.3). Many inquiries found at this stage were usually associated with such topics as learning procedures and technical concerns. A short series of talks between an online tutor and student at the beginning of the programme illustrates this.

Great to see you all at the Workshop! I'm looking forward to seeing your messages on WebCT. It's over to you all now!

(John: Tutor)

Thanks, John. Am I the first to log on to WebCT from home? I wanted to see how it worked with my low-bandwidth connection at home - it's fast enough! It was such a pleasure to meet everyone at the workshop. I'm looking forward to the new experience of working in an online group.

Many thanks also to Mark and Adam for making our stay in York so enjoyable, and for giving up your free time to make us feel at home.

(Beth: Student)

No problems, Beth. It was a pleasure for us too. Glad it's working from home - 56k dial up is like lightning with WebCT here too (pity it's not the same for the rest of the internet!!).

(John: Tutor)

Like the quantitative findings, a review of the conferencing messages showed that emotion was a common affective indicator in OLCs. Online participants in this study always used social communication that contained a constructive emotion in their messages, making them more friendly and welcoming. Particularly, it was used early at the start to warm-up a message that later embodied an in-depth discussion. Although the use of humour was infrequent, it could be employed together with emotion to make the message more relaxed and personal. The following example at the beginning of the module illustrates this point.

Hello, I am quite happy to be the first one to answer these questions in this module. It is not often the case!! Here we go... <<followed by a detailed discussion of the topic>>

(Jane: Student)

Clearly, the findings from the previous section revealed that personal values were the most common affective indicator. Discussions in learning communities, where students can exchange their personal values and ideas, allowed them to develop their sense of presence and create a deeper understanding of the learning topics based on different perspectives. The qualitative data supported this notion and showed that personal values tended to promote both active discussions and advanced cognitive development of online students. The following example illustrates the scenario in which two students were discussing a learning issue. A student started her message by pointing out the benefits that the computer conferencing provided. She then acknowledged the previous comments posted by other class members and expressed her own personal viewpoint. Subsequently, another student added and further discussed the topic in detail.

Just a brief contribution on this as I too have not yet got hold of the paper despite requesting it around two weeks ago. The BB discussion is interesting as it highlights the difference between... While I agree with the criticisms put forward by Kate and Richard I think the study is not an unreasonable one for the purpose. If I were designing this study my main concerns would be... <<followed by a detailed discussion of the topic>> Can think of nothing more to add without reading the papers!

(Jill: Student)

Thanks, Jill. I will try to go over your reflections. I agree 100% with your answer. I would just add that.... There might be a bias in comparing... For Q3, I think you answered this wonderfully. I had just summarised as... <<followed by a detailed discussion of the topic>>

(Sara: Student)

Jill, I have managed to get a copy of the paper and I can see now that... <<followed by a detailed discussion of the topic>>

(Dave: Student)

Finally, although self-disclosure was not very common for online students, the qualitative data suggested that this affective indicator had a positive impact on learning. Self-disclosure not only helped online students establish social rapport, but also encouraged them to participate and share their knowledge in the learning community. The following example shows the use of self-disclosure along with a request for learning support from other participants in the programme.

Dear Anyone, I've got stuck at this question. I guess I've gone wrong. I could draw marginal product and average product functions and see where they cross which might do something - but probably not.... I am lost and frustrated. Can anyone give me a clue to set me on the right track? Thank you, Jane

(Jane: Student)

The message above invited feedback from other students as well as useful guidelines from the tutor. The qualitative data showed that once she developed a better understanding of the concepts, it seemed that she became more confident to join in the conversations. The qualitative data also indicated that online students who expressed their vulnerability would receive not only academic but also social support from other OLC members, especially tutors, who played an active role in facilitating the learning

process. The following example illustrates the expression of self-disclosure by an online student and a level of comfort provided by an online tutor.

> *I am sorry. I have no experience with drawing graphs in PowerPoint, Excel or any other programme. I am prepared to learn this, but I don't know how quickly I can manage it.*
>
> (John: Student)

> *Don't worry too much for the moment as you will only be expected to draw graphs using a pen and paper and calculator for figures in this exam. As long as you can work out the numbers with a calculator and draw these by hand on graph paper, this is completely acceptable. Hope this puts your mind at ease!*
>
> (Mark: Tutor)

As well as affective responses, cohesive responses among online participants were also important in OLCs. The use of cohesive responses reflected communication that aimed to build and enhance a sense of belonging, which was necessary for the online community building process (Garrison et al., 2000). Although cohesive responses needed some time to develop in online contexts (see Section 7.4.1.2), the qualitative data suggested that online participants, as community members, built up social cohesion and a sense of belonging through the active involvement in joint activities. The following messages between two online students talking about a private meeting before a residential workshop took place illustrate this.

> *Dear All, just a short message to see if there is anyone interested in meeting up on Sunday night before the seminar. Nothing hectic... remember we need to be focused for Monday morning! Take care, Andy*
>
> (Andy: Student)

> *Hi Andy, sounds good. I'll probably arrive early Sunday evening and I'm staying on campus. Any ideas about where/when we can meet up? Is anyone else interested in coming along?*
>
> (Paul: Student)

The above conversation took place in the second module of the programme, where people had established a stronger social connection. At that time, they already had a certain level of trust and personal relationship, and were familiar enough to create a

social activity. From the dialogue, the inclusive pronoun "we" was also used to establish a sense of belonging. The use of group reference and inclusive pronouns promoted not only group unity, but also a shared sense of purpose, thus increasing active participation among online members. The following example demonstrates this.

> *While some of you are probably recovering from the workshop at this moment, or travelling home, I will give this exercise a try since we are way behind schedule with our group.*
>
> (Michelle: Student)

Phatics was another cohesive indicator used to create a friendly, sociable, and welcoming atmosphere rather than to impart information. Although it was not commonly employed by online students in this study, using phatics to indicate a sense of presence not only created a good atmosphere for cognitive development, but also nurtured a close-knit connection, which is important for a long-term relationship. In this programme, such a personal connection seemed to be very important because students were professionals who worked in the same field and could possibly have an opportunity to share their experience and expertise in the future. The following is an example of the use of small talk by an online student at the beginning to create a social rapport and set the tone of the message.

> *Hello guys, Happy New Year! I guess the rest of this group is like me - trying to get back to work and study after the holiday.*
>
> (Jane: Student)

Another example is a message posted by an online student illustrating the use of phatics just before a new discussion started. Although it was not related directly to learning, it reflected a mutual sense of belonging to the group in an online learning environment.

> *Hello my group, I woke up! Sorry to have been so silent. The organisation of the wedding on Saturday took me some time. But it was the wedding of the century, they said. By the way, I would like to add a few things regarding exercise 1.2 before I move to the next ones... <<followed by a detailed discussion of the topic>>*
>
> (Liz: Student)

Based on the findings from content analysis, salutation/closure was the most basic cohesive indicator among participants in OLCs. In fact, it was used quite regularly by online students throughout the programme. Like other cohesive indicators, however, the use of salutation/closure declined once participants developed a certain level of a sense of community. A review of the conferencing messages showed that online members tended to post their messages continuously without greeting or closing their messages when a dynamic discussion was in progress. The following series of messages from a threaded discussion in the second module provides a scenario that illustrates this. It started with the message of a student discussing a current issue. Two students critically added some comments to the topic.

> *Dear all, I would like to give this exercise a try.... In general, I would say that... <<followed by a detailed discussion of the topic>> What do you think, people?*
>
> (Liz: Student)

> *I agree with Liz that.... Just wondering though what would happen if... <<followed by a detailed discussion of the topic>>*
>
> (John: Student)

> *Just another thought on the demand analysis. I think that we need to carefully consider how.... It is quite plausible that... <<followed by a detailed discussion of the topic>>*
>
> (Mel: Student)

Based on the above discussions, salutation was found in the first message in which the discussion thread was started. Invitation was then used to elicit more contributions from others. In the second message, where the topic was further discussed and communication seemed to be more task-focused, salutation and closure were absent. In this situation, group reference and vocatives were employed by participants to maintain their sense of group cohesion.

The expression of actual feelings among people indicated a group cohesion and a condition of high intimacy (Murdoch, Chenowith, and Rissman, 1969 in Cozby, 1972). The qualitative data supported this notion by showing that the participants were likely to reveal more about their actual feelings once they developed a closer relationship with the

others. The following message posted by an online student in a later module shows an expression of a personal feeling as well as a level of intimacy. In the message, this student was disappointed about the lack of contribution from the other group members and attempted to encourage active participation from them. It could be seen that the use of such affective responses as emotion and personal values were employed throughout the message.

> *Hello everybody, I just came back from a week's holiday in Paris, expecting that online conferencing would be old-fashionably full of messages - hoping that I would have missed out on the most interesting debates,... but nothing of the sort. In the first module, we had really good discussions going. In the second it already dwindled, but now it seems to have come to a complete stop. I would like to find out what is happening. Nobody finds it fruitful anymore? Does it cost too much time? Are exercises not interesting? Stuff too easy to spend time on???*
>
> *According to our module tutors, there are "lively discussions" going on. So the other group(s) must be doing well. Why are we not doing better? In our group, we have most of the far-away students, so it would actually be even more important that we make the most of the WebCT opportunities.*
>
> *Personally, I have always found it very useful, but I do not want to be the one who has to start a new exercise all the time and certainly when I do not get any responses. So what are we going to do? Give up or pick up? As you already guessed, I am in favour of the latter. Hope to hear from you, Jane*
>
> (Jane: Student)

The kind of message (full of emotional, encouraging sentences) seemed to work quite well. The result was a more active contribution from other participants. Such expressions that contained emotion and humour as "now that I am catching up... let's hope that I can stay on track!!!" and self-disclosure as "sorry for the silence" were also used before starting their discussions. After some messages were posted, the first student acknowledged the increasing participation by stating, "glad to see you're back on the board". In this situation, online tutors also played an important part in encouraging students' contributions using various techniques, such as providing a summary of the discussions and asking students to share their views.

Because of the relative lack of social cues, it was important that participants in text-based environments showed that they were communicating. Interactive responses, such

as acknowledgement, agreement/disagreement, help/assistance, inquiry, and invitation, were useful indicators that allowed online members to maintain their presence in OLCs. These responses helped promote dynamic discussions, as well as knowledge acquisition and sharing that were beneficial to learning in such contexts. The quantitative findings from the previous section showed that acknowledgement was common in the messages of online students. The qualitative data further indicated that this interactive indicator performed two important functions in OLCs. The first function was acknowledging others' contributions, which allowed students to reveal their active presence in the discussions. The following example is a short conversation between two online students. The second student acknowledged the first message, using vocatives ("James") to direct her message back to a particular person.

> *Hi everybody! I have attached an Excel file with the scatter plot asked by question 1. Please have a look.*
>
> (James: Student)

> *James, I have an identical scatter plot and agree that this is a non-linear relationship which seems to indicate a correlation between health expenditure and falling mortality rates.*
>
> (Maggie: Student)

Another function of acknowledgement was complimenting the others on their contributions. It was performed to show recognition and appreciation to those who made valuable comments in discussions of topics. The review of the conferencing messages showed that it not only increased social connections, but also promoted active participation and possibly cognitive development among online participants in OLCs. Appropriate praise when the others made a meaningful contribution, or achieved particular tasks, was important. Using phrases such as "well done" or "that's an interesting idea" might sound insignificant but it helped to enhance self-confidence and class participation of online students. In the following example, an online student acknowledged previous contributions made by two students and complimented them on their ideas before providing a useful suggestion about interpreting statistical data that, later on, triggered some interesting discussions on the topic.

> *Both Michelle and Maggie's answers sound great, but we must be cautious in drawing conclusions from such limited data. If we*

> *are to use data linking income to health, it would be advisable to... <<followed by a detailed discussion of the topic>>*
>
> (Pete: Student)

In addition to acknowledgement, the use of agreement/disagreement resulted in positive learning experience in OLCs. On the one hand, the expression of agreement with other students' ideas reflected some form of trust. It also allowed other class members to feel more confident in their thoughts and contribute more actively to the class. On the other hand, the expression of disagreement could stimulate reflective thinking and learning. The qualitative data suggested that messages containing this interactive indicator, particularly disagreement, encouraged active and in-depth discussions. Disagreement with the tutor or among students themselves was a form of cognitive conflict in OLCs. Reflecting on the conflict and its resolution was very useful for learning in such environments (Johnson & Johnson, 1996). The following is an example of agreement/disagreement that an online student posted to the class discussions.

> *I fully agree with you on Q1 and Q2, but I would like to express a different opinion on Q3. You are right that the difference in the expected outcome is very small. However, I think that... <<followed by a detailed discussion of the topic>>*
>
> (David: Student)

In the above message, the student explained reasons for disagreeing with the ideas of the previous student and suggested an alternative view based on their personal experience. The message then generated an ongoing discussion on the topic among the students. The subsequent discussions provided them with the opportunity to reflect on the others' perspectives and create their own understanding.

Help/assistance was another social presence indicating interactive communication among online participants in OLCs. Helping each other reflected a sense of presence and created companionship among the participants. It also allowed students to learn from each other and develop new knowledge from diverse perspectives. The following remark illustrates support that a student provided to another student concerning the learning exercise.

Hi everybody, Happy New Year. I am still alive although I have been a little quiet. Now, I am on board and would like to add some thoughts to Exercise X. As I read through Mary's and Jane's very good answers to this exercise, I could not help but to wonder if the scenario will change if.... Just some few comments from the group please????

(Diane: Student)

Hi Diane, good to hear from you again. I think in the situation you described (e.g., in developing countries), a public health care system is different. Although health care is officially (!) free, I would not expect much moral hazard, leading to increased utilisation. This might be partly due to... <<followed by a detailed discussion of the topic>> Hope this helps.

(Mary: Student)

In OLCs, help offered was not limited to academic support, but included other assistance that helped online participants to succeed in learning. The following is a short conversation that illustrates a call for technical advice from the others and the suggestion one student received. The latter message reflected a sense of presence of the other OLC members in the discussions. An offer of further assistance also allowed social connections to develop.

Hello, I have been working on this exercise, too. It's difficult to discuss it without comparing diagrams, don't you think? Does anyone know a really easy way to post a diagram on the bulletin board? What about PowerPoint? Thanks, Jane

(Sue: Student)

Dear Sue, how about generating the graphs in excel and then converting to PDF using Adobe? If any of you guys do not have Adobe on your pc, I will be glad to do the conversion for you.

(Tom: Student)

Another common interactive indicator used by online students in both cohorts was inquiry. The use of inquiry helped students find the solutions to learning topics by eliciting different perspectives from other participants. The qualitative data suggested that this indicator not only promoted active participation, but also stimulated various levels of reflective thinking and cognitive conflict, resulting from opposing views among the participants. The following example illustrates the use of inquiry together with self-disclosure in order to seek advice and guidance from the others.

> *Hi, has anyone attacked Exercise X yet? I have got 'stuck' on question 3. I have progressed sideways, in perhaps thinking that the drawing of the production function curves is fine and that worrying about anything else is wrong. But how to read off the level of expenditure is still flummoxing me. Can anyone help in giving me a clue to what am I not seeing/have not learnt? Ta.*
>
> (Max: Student)

Closely related to active participation in OLCs was the use of invitation. Although this interactive indicator was not very common in the current study, encouraging other participants to contribute and share their knowledge actively was important for collaborative OLCs (Palloff & Pratt, 1999). The qualitative data suggested that invitation helped to promote active participation and discussions among online members. The use of this indicator was usually found at the end of the message after the original thoughts and personal ideas were presented. The following example illustrates its usage by an online student, which resulted in participation and feedback from the others.

> *Dear colleagues, I guess that this is the kick-off of our discussion, since there seem to be no previous messages posted in our discussion group. My question/remark is about the definition of 'resources'. In our module book, it is taken to include both inputs and outputs. I find that confusing. According to my understanding, resources are the inputs to production of goods and services. They are usually divided into land, labour and capital resources. I can only understand outputs to be resources, in so far as they are inputs into another production process. Does anybody have any ideas about this? Have a nice Sunday. Hope to talk to you soon online.*
>
> (Meg: Student)

The review of the online discussions supported the notion that social presence played an important part in social interaction and learning. In particular, online students could use social presence to create affective communication, establish social connection, and stimulate interactive learning in OLCs. The online messages also provided a clearer picture of how online students developed a sense of presence using different indicators at different stages of learning in such contexts. In the next section, excerpts from the conferencing messages posted by online tutors in both cohorts are also presented. They are used to illustrate the expression of social presence by tutors in OLCs. Like students, online tutors created their sense of social presence to reduce the psychological distance between themselves and their students. Various social presence indicators were

employed to create a vibrant learning environment that enhanced the students' learning process in such contexts.

7.5.2 Social presence: Online tutors

Many research studies (e.g., Richardson & Swan, 2003) have focused on the social presence of online tutors and have related such a feeling to positive students' learning such as active participation and learning satisfaction in online classes (see Section 5.4.2). Establishing a sense of social presence can create a welcoming learning space and a personal relationship between tutors and their students. Although face-to-face contact, as well as an array of such nonverbal cues as smiling and gestures, is missing in online contexts, online tutors can convey socioemotional content and their sense of presence through such text-based communication as computer conferencing.

At the beginning of online learning, students may feel confused and are not sure what they are supposed to do (Harasim et al., 2001). It is important that online tutors create their social presence and express affective communication at this stage in order to establish a supportive learning environment that entices online students to participate. The quantitative findings described previously (see Section 7.4.2.2) showed that emotion was the most common affective indicator for online tutors. An analysis of conferencing messages supported these findings. The following example is the first message posted by an online tutor at the start of the module. It illustrates the use of such affective indicators as emotion, humour, and personal values to make the message friendly and personal. The example shows that social presence helped lessen the psychological gap and develop a sense of being of online tutors in OLCs.

> *Hello course participants, students, victims, fellow travellers or whatever term fits best. I'm looking out of my hotel window admiring the sea and sand of Nice (that's not the National Institute of Clinical Excellence by the way!) sipping a large glass of Pimms, wondering what you guys are doing (sad lives or what!!!).*
>
> *Anyway, I would like to welcome you to module X and say a few words about the thinking behind it. This module introduces you to.... In Units 1 and 2 we cover the questions of how to measure.... In Unit 3 we look at.... The remaining units attempt to put all this together. We end the module with a discussion of the way to critically appraise....*

> *I hope you enjoy the module and derive some valuable knowledge and skills. I also look forward to seeing you at the Workshop. Good luck and best wishes, Tim*
>
> (Tim: Tutor)

Online tutors also used such affective responses as humour to encourage students' participation in online discussions. Although the use of humour by online tutors was not frequent, it helped to increase the social aspects of online communication and enhance active participation. The qualitative data suggested that the use of humour allowed students to communicate more comfortably in a mediated learning environment. The following series of exchanges between an online tutor and student illustrate this. An online tutor posted the first message to encourage more contributions. The tone he used in the message was playful. Subsequently, an online student replied with humour in her message and then posted successively a few long messages for discussion. The tutor, once again, acknowledged and complimented her on her contributions with another entertaining message.

> *Ok you guys, I give up, where are you hiding - you are not allowed to play hide and seek on the bulletin board. "Come out, come out wherever you are".*
>
> (Tony: Tutor)

> *Not hiding just busy.... Sorry to be so quiet but I am now having an economics blitz. Anyway, here is my contribution to this exercise... <<followed by a comprehensive discussion of the current topic then by a few lengthy messages for the other topics>>*
>
> (Judith: Student)

> *Blimey Jude, when you blitz economics, you really do the business. Well done!*
>
> (Tony: Tutor)

Although self-disclosure was very uncommon in tutors' messages, the use of this affective indicator was found in the study. The qualitative data suggested that self-disclosure expressed by online tutors was not related to learning contents. Rather, it usually involved a social communication that sustained a sense of presence, and was used to promote an affective learning. The following example illustrates how an online tutor disclosed himself in an OLC.

> *I'm sorry that I've been a little delayed with my responses to this discussion, but the first couple of days of this week were taken up by an examiners' meeting to ratify all of the exam grades from the past year, and I'm just surfacing from these administrative duties...*
>
> (Mark: Tutor)

Like students, online tutors also played an important part in creating a sense of presence in online settings. The use of cohesive responses by online tutors helped bridge a psychological gap among participants in such environments. Such cohesive indicators as group reference reflected a sense of common purpose and could be used by online tutors to enhance relationships with their students. The following message by an online tutor is an example of using an inclusive pronoun to indicate a sense of belonging and a shared objective. The tutor also started the message using vocatives to make it more personal.

> *Thanks Jane, it's an excellent 'real world' example! However, during next week, our residential workshop will take place and we will work through these exercises together in the workshop.*
>
> (Rena: Tutor)

In many cases, online tutors used inclusive pronouns in their messages with the aim of encouraging students' contributions. An online tutor posted the following:

> *Just to remind you all that we are on Unit X this week and next and then you have a week of revision for the exam. So keep up the good work - we're nearly there!*
>
> (Gary: Tutor)

Apart from the group reference, online tutors also used phatics to create a hospitable learning environment. Originally, Malinowski (1923) described the term phatic communion as small talk that aims to establish unity rather than to impart information. A greeting or a general comment about a daily subject, such as the weather, can create an ambience that serves this purpose. However, the use of phatics in text-based communication could be more than just an exchange of words. The lack of social cues in a text-based online environment could possibly require a more descriptive expression to convey feelings and create sociability. The following shows the use of phatics in a message posted by an online tutor after the workshop took place.

Hi, just for a bit of fun there is an additional link on the home page entitled 'workshop' for those of you who'd like to check out James's photography skills. To see a big picture of any of the images just right click on it and choose 'view image'. I don't advise doing this on the one with me attempting to collect the money at the end of the night: do I always look that terrible?! Have a good weekend,

(Mark: Tutor)

Based on the quantitative findings, the use of salutation/closure by online tutors was very common compared to that of online students. The qualitative data further indicated that a greeting at the beginning of messages such as "Hi you guys and well done for your excellent discussions" set the tone of the communication while closing the message with cheerful language, such as "keep up the good work!", encouraged active participation among online students. Salutation was usually found with the use of vocatives in order to call for attention or identify the addressee such as "David, I agree with your argument".

Like students, online tutors also developed a sense of belonging to the community. Although quantitative content analysis could not be used to observe the development of social presence, the review of the conferencing messages showed that online tutors developed a sense of presence over time. The following example is an extract from the end-of-unit message posted by an online tutor at the end of the module showing the development of group cohesion and social connection among participants in an online learning environment.

I hope the above information is useful. Please do not hesitate to contact me if you want to discuss anything during your revision for the exam. One final reminder is to also go through the slides on the lecture by Kevin from the workshop and make sure you're happy with everything he went through.

I also wish you all a very big "good luck" for your exams. I know that you are studying really hard for them. Finally, I have to say that I feel very sad to think that we are approaching the end of our Module. I have really enjoyed getting to know all of you, and I do sincerely hope you will keep in touch in the future. Take care, and thanks to all of you for everything. Best of luck!

(Rena: Tutor)

As in a traditional setting, tutors in an online class need to be actively present in class and play active roles to encourage social interaction and collaboration among online

participants. The use of appropriate responses and feedback helped online tutors maintain their social presence and create a supportive learning environment that promotes such meaningful activities (Harasim et al., 2001). The quantitative findings described earlier showed that acknowledgement was a common interactive indicator for online tutors. Acknowledging students' contributions, as well as complimenting them on their ideas, was an indispensable factor in interactive communication in online settings, where students had to work mostly on their own. The qualitative data suggested that acknowledgement encouraged students to engage actively in class discussions while admiration provided a level of confidence and created a supportive environment for knowledge sharing. The following example shows how an online tutor performed this function.

> *Thanks Michelle for the message and well done to all of you on Exercise X, which I think was answered extremely well. I have posted a summary of all the key points raised in the End of Unit message, but if you have any comments or queries about anything, please feel free to drop me a line.*
>
> *I look forward to seeing how you get along with Exercise 2.2 where we look at the relationship between health spending and health and what factors might explain differences in mortality rates between countries.*
>
> *Please feel free to post any attachments if you need to. Have a good weekend.*
>
> (Rena: Tutor)

The following is another example of an acknowledgement posted by an online tutor. The tutor started the message with a compliment on students' work and then elicited further contributions to the next exercises.

> *OK well done to you all - have a glass of wine or beer whatever as a reward for such good work on this one. Time to move on now, so make sure you have a go at Exercise X this weekend so that you are ready to start Unit X on Monday.*
>
> (Tony: Tutor)

Expressing approval or disapproval with students' messages indicated that tutors were attentive and interactive in the discussions. While agreement/disagreement was not commonly used by online tutors, the qualitative data suggested that it helped encourage interactivity and supported the students' learning process. On the one hand, the

expression of agreement with students' ideas helped confirm their understanding and created a higher level of self-confidence. Constructive disagreement, on the other hand, allowed students to evaluate their thoughts and encouraged them to provide reasonable evidence to substantiate their ideas. The review of the conferencing messages also showed that the expression of agreement or disagreement by online tutors was usually followed by a helpful explanation that provided a better understanding of the topic. The following example shows how this indicator was used in an OLC.

> *James's response is great, his point being that.... This is a very good argument BUT it would be even better if he... <<followed by a comprehensive explanation of the topic>>*
>
> (Tony: Tutor)

Based on the quantitative findings described earlier, help/assistance seemed to be the most common interactive indicator for online tutors in this study. The review of the online discussions further suggested that providing help and learning support was important and allowed tutors to maintain their presence in the learning community. As facilitators, online tutors provided students with a learning structure that outlined the learning process. Guidelines for effective use of media were also presented to help students become more comfortable and confident communicating in mediated environments. The following example illustrates guidance from an online tutor on how to compose a message in WebCT®.

> *Dear all, some of you may have found that your messages look a little 'strange' when posted on WebCT: you thought you had separated one paragraph from another but then when you view the message that you've posted, the lines just 'run on'. This is because, in order to separate blocks of text, you must always leave a blank line between one block and the next. This is especially important when inputting tables: if you are writing a table make sure you include a *full blank line* between each row. The golden rule is always to 'preview' your mail before sending it.*
>
> (Mark: Tutor)

Another interactive indicator that online tutors employed regularly throughout the programme was inquiry. Compared to students, online participants used this social presence indicator for different purposes. While students made an inquiry to seek help or solicit an answer, tutors performed this function mainly to stimulate critical thinking or

develop constructive arguments among students. The qualitative data suggested that online tutors provided a scaffold or structure to support the whole learning process using inquiry. Asking students a challenging question or casting doubt on their thinking stirred up new ideas and allowed them to carry on discussions. This was aimed at enabling students to develop their own explanations or new solutions to their problems and move forward to a higher level of cognitive development. The following example shows how an online tutor performed a facilitative role using inquiry to encourage such a learning process.

> *Nick, I am sure if you are that person whose cancer is detected on the 6th test, you will think it money excellently spent, but does it cost only $4,000 as you say?? You are quite right that, to make a decision on the appropriate number of tests we need some feeling for the alternative use of these resources. How might your answer change if you had similar information for a screening test for *another cancer*? How might you compare your marginal cost data from the two screening tests? Think back to your answers to Exercise X!*
>
> (Tony: Tutor)

Finally, invitation was another social presence indicator that stimulated active participation among online students in OLCs. Because learning in an online context can be a lonely activity as students have to work mostly on their own, and perhaps with little contact with other class members, online tutors must play an important part in encouraging active participation in class discussions among online students. Based on the review of the conferencing messages, eliciting contributions was an important role that online tutors used to enhance the learning process (and possibly the learning outcomes) of online students. Since students in the study usually possessed a certain level of knowledge and experience related to the field, encouraging them to bring it from their work and share it with others helped create a meaningful learning environment. The following series of exchanges illustrate how online tutors in this study created such a vibrant environment using invitation.

> *Come on guys, this exercise is just as important as the others! There's no point for me giving you feedback if you haven't posted any discussions!! There's little more than a week to go till your exam and this Unit has some very important issues to cover!!*
>
> (Rena: Tutor)

Well, I kind of lost it a little on this one after question 5, but here goes... <<followed by a detailed discussion of the topic>>

(Dave: Student)

Thanks, Dave for starting the discussion. I would agree with you on questions 1-3. I'm guessing question 4 was a typo since.... As for question 5 you are right, we have to.... Let's hear some more thoughts on these...

(Rena: Tutor)

Hi, sorry about my absence. I always seem to be out of synch!!! Anyway, I have caught up, better late than never! <<followed by a detailed discussion of the topic>>

(Sara: Student)

The qualitative data suggested that the use of invitation by online tutors usually promoted students' contributions. In the first message, the tutor encouraged active participation using such social presence indicators as invitation and emotion. She also acknowledged a contribution from an online student using vocatives and expressed agreement with his ideas. She further discussed the topic and then elicited more contributions from other students. Another student came up and started her message with self-disclosure and humour followed by the discussion in detail.

The review of the conferencing messages in this section has provided a clearer picture of how online tutors expressed their sense of presence in OLCs. Various types of social presence indicators were employed throughout the programme to support the teaching and learning processes. In the next section, a summary of the key findings from the study is presented and discussed.

7.6 Summary and discussion

In the previous sections, the content analysis of social presence among online participants (see Section 7.4) and the review of the conferencing messages from online discussions (see Section 7.5) were performed. In particular, content analysis allowed the researcher to observe social presence development, and its patterns, quantitatively. In addition, the qualitative data, which were used to provide an illustration and support the quantitative findings, allowed the researcher to understand more about how social

presence was expressed in contexts. To some extent, the overall study provided an increased understanding of how online participants, both students and tutors, in online learning environments created, developed, and sustained their sense of presence using text-based communication.

For online students, the findings showed quite similar development of social presence indicators in both cohorts. The findings that affective responses were used most in the first module provided evidence that online students needed a high level of affective communication at the early stage of community building (Polhemus et al., 2001). At this stage, students started discovering and getting to know each other as quickly as they could. Such affective indicators as emotion, personal values, and self-disclosure were employed frequently as they helped students create their identities and a swift trust that allowed for immediate online collaboration (Meyerson et al., 1996). They also played an important part in creating a pleasant environment, establishing a personal relationship with others from the start, and making it easier for them to collaborate throughout the programme. After the first module, however, affective responses seemed less important as the usage declined. These findings were consistent with previous studies (e.g., Hara et al., 2000), indicating that social communication decreases as the course progresses.

While affective responses were most frequently employed in the first module, cohesive responses seemed to require more time to establish in OLCs. The findings showed that the use of cohesive responses, especially salutation/closure, vocatives, and group reference by online students, constantly developed over time and reached their peak usage in the second or third module of the programme. These findings suggested that participants needed some time to develop a sense of community and group cohesion, especially in an online environment where face-to-face contact and nonverbal cues were not usually involved in the communication process (Walther, 1992). The findings could also be explained by Wenger (1998)'s CoP development. According to Wenger (1998), participants who are drawn together in the early stage of community development face similar situations without realising the benefits of a shared practice. As people start to build their connections, they join and recognise the potential of other members in the community. Therefore, in the "coalescing" and "active" stages of community building, the use of cohesive responses by online participants seemed to be more necessary than at the earlier stage of development.

The findings that cohesive responses developed at a different rate between the two cohorts also suggested that the speed of community development could vary. Members in some communities might get to know each other easily and build social cohesion among themselves quickly while those in other communities might need slightly more time to do so. In fact, the pace of community development could be influenced by various factors, such as group norms, common ground, self-motivation, personal commitment, etc. However, once participants developed a greater sense of community, it seemed that the use of cohesive responses became less important as the number of cohesive responses used by online students declined slightly over the next modules until the end of the programme. The use of salutation/closure was a good example. Based on the findings, salutation and closure declined after a certain level of group cohesion was achieved. According to Rourke et al. (2001a), cohesive communication, such as a greeting and a flattering remark, is less necessary for people who have built a strong and long-term connection. Similar findings were also found by other research studies of online learning. Hara et al. (2000) and Swan (2002), for example, reported that social cues and formal expression decline significantly as students come to know each other better.

Although no development across modules was found, the findings seemed to reveal similar patterns of interactive responses by online students in each module. Acknowledgement and inquiry were the most frequently used interactive indicators in both cohorts. Acknowledgement was commonly employed by online students to serve two basic functions in OLCs. It was used to show that OLC members were still active and socially present in online class discussions. It also helped create a personal relationship and a climate of trust among OLC members when they used it to compliment others on their contributions or ideas. Like acknowledgment, inquiry was important and commonly found in students' messages throughout the programme. The findings from both cohorts suggested that the use of inquiry not only encouraged feedback from other students but also allowed them to obtain useful comments and alternative solutions from tutors. In contrast, the use of invitation by online students to elicit others' contributions was not very common compared to other interactive indicators, although it was found throughout the programme. This was probably because online students in this programme might prefer to use other interactive indicators to

show their presence, or they might think that online tutors were expected to perform this function in OLCs.

The findings also provided an increased understanding of how online tutors in an OLC projected and conveyed their presence to the class members using asynchronous text-based communication. Although the development of social presence could not be observed due to the change of tutors across the modules, content analysis showed patterns that provided a better understanding of how social presence was employed by online tutors. The findings from both cohorts showed that online tutors expressed their affective communication in the same manner. Emotion was the most frequent affective indicator for online tutors. The findings also suggested that the use of emotion where appropriate helped promote a constructive learning process. In particular, constructive use of emotion by online tutors helped create a supportive learning environment that fostered active discussions and positive attitudes towards learning.

Although it was an important social presence element in OLCs, the findings revealed that humour was not frequently employed by online tutors in each module. Similarly, recent studies show that the use of humour is infrequent in text-based environments (Rourke et al., 2001a; Shea, Swan, Fredericksen, & Pickett, 2002; Swan, 2002). They also suggest considerable caution in using humour in text-based communication. In a face-to-face situation, it is known when someone is being humorous by their tone of voice or their facial expressions. Without nonverbal and contextual cues, it can be difficult to detect attempts at humour (Davie, 1989).

Unlike affective responses, the only pattern of cohesive responses by online tutors found in each module was the use of salutation/closure. The findings from both cohorts showed that using salutation and closure was the most basic function for online participants, both students and tutors, to sustain group cohesion in an OLC. However, the use of other indicators in this category varied from module to module. This was probably because online tutors in each module expressed cohesive responses in different ways based on their preferences and teaching styles.

The findings from both cohorts suggested that online tutors used interactive indicators in quite the same manner. While inquiry was very common in students' messages, the use

of help/assistance was clearly the most common indicator for online tutors. The qualitative data, in particular, showed that providing online students with course and non-course related support encouraged an effective learning process and sustained their sense of being in online environments. The findings that showed help/assistance as the most frequent indicator reflected the role of online tutors as facilitators in an online setting. As learning facilitators, they were responsible for providing sufficient guidance to help students in learning activities (Harasim et al., 2001). Different types of learning support, such as answering questions, suggesting information and resources, and giving personal advice, were found in tutors' messages.

Apart from learning assistance, the findings showed that acknowledgment was another common interactive indicator that helped online tutors maintain their social presence throughout the programme. Online tutors used this indicator regularly not only to acknowledge students' messages, but also to offer compliments and encourage active participation of online students in an OLC. The findings were supported by previous studies (e.g., Tagg & Dickinson, 1995) suggesting that online tutors need to provide both a sufficient and consistent level of encouragement to support a successful online learning process.

7.7 Conclusion

This chapter has reported the findings from the first part of the main study. It addressed the research question and filled some of the research gaps by investigating the development of social presence, and its patterns of usage, in an online learning context. Using a longitudinal study design, content analysis was applied to obtain an understanding of how social presence was conveyed and developed in such contexts. Based on the findings from two cohorts, affective responses among online students were the most common in the first module. This suggested that affective communication was the most important at this stage of OLC development. Online students should pay a great deal of attention to this stage while online tutors should make a serious effort to create a venue that supports such communication. Cohesive communication and social connection, in contrast, required some time to develop among online participants. Thus, online tutors and other community developers should be aware of this and be patient in such a development process. Finally, it seemed that interactive responses were used

widely and quite constantly across modules. This probably reflected the characteristics of online students in this type of programme.

For online tutors, although social presence development across modules could not be observed, certain patterns of usage in each module were found. The findings from both cohorts showed that the expression of emotion was clearly the most common indicator of online tutors. The findings implied that online tutors also considered affective communication important for a supportive learning community. Messages with constructive emotion and feelings from tutors made the messages more welcoming and sociable, thus increasing social communication in an OLC. Like online students, online tutors used salutation/closure as the most basic function to maintain social cohesion online. This was probably because using salutation and closure was considered a quick and easy method to maintain a sense of presence among online members. Finally, to enhance interactive communication in an OLC, online tutors in each module provided help and assistance regularly to support the online learning process. These findings supported the growing importance of online tutors as facilitators and supporters of the learning process (Harasim et al., 2001).

From this chapter, it can be seen that combining a longitudinal study design and content analysis was a useful method that allowed social occurrences and interaction in OLCs to be examined in a meaningful way. However, the process was demanding in terms of time and effort, especially when virtually the whole process was conducted by only one researcher. The findings obtained from a single case study and the nature of content analysis, particularly latent content analysis, posed a question of how much the results can be generalised. Nevertheless, various criteria were applied with the aim to enhance the reliability and validity of the research process (see Section 7.2.2). Similar findings from two different cohorts also helped enhance the validity and generalisability of the study.

At this point, a better understanding of social presence in online learning environments has been achieved. However, the study of social presence in such contexts still requires further investigation as to its relationship to such factors as gender, learning process, and cognitive learning outcomes. In the next chapter, the other research question put forward earlier is addressed.

CHAPTER 8

Main study (Part II)

This chapter reports the findings from the statistical analysis by which social presence was further explored in relation to other factors related to learning. At this stage, quantitative data obtained from content analysis in the previous chapter were investigated using different statistical techniques.

8.1 Introduction

In the previous chapter, conferencing messages of online students were examined to observe the development of social presence in online learning contexts. To explore social presence in detail, further data analysis is required. The literature concerning social presence has gained more attention from online educators who believe that it helps improve the learning process and outcomes (Rourke & Anderson, 2002a). However, the study of the impacts of social presence on learning in online contexts is still limited and clearly requires further exploration (Richardson & Swan, 2003). Therefore, in this chapter, social presence is examined in association with other factors (e.g., gender and active participation) usually considered important for learning in such contexts.

Based on the research problem put forward previously (see Chapter 6), this chapter attempts particularly to address the second research question: What are the effects of social presence on learning in asynchronous text-based OLCs? In order to address this question, the question is translated into six testable hypotheses derived from the literature on social presence and related areas reviewed earlier (see Chapter 5). These hypotheses are tested using various statistical techniques, such as t-test and regression analysis. In the following sections, these hypotheses and the methods used to carry out data analysis are further described.

8.2 Hypotheses

This section presents the hypotheses to be tested in the study. Three important factors related to social presence and learning—gender, active participation, and learning outcomes—are investigated. Based on much of the literature described earlier (see Section 5.5), it is evident that males and females are dissimilar in many different ways. Apart from physical features, they are different in their verbal, mathematical, and perceptual abilities, personalities, and patterns of communication (Aries, 1996). Although claims have been made that communications are equal in technology-mediated communication where gender and identity are disguised (Hiltz & Wellman, 1997), these issues seem to exist and transfer to an online learning context (Herring, 1992). It is therefore not surprising that these dissimilarities would contribute to different types and degrees of such socioemotional content as the social presence expressed between genders in OLCs.

Many research studies also claim that social presence is related to active participation and better learning outcomes in online contexts. In particular, social presence, which encourages active interaction among online participants, has a positive impact on students' perceived learning (Picciano, 1998; Shea et al., 2002) and academic performance (Russo & Benson, 2005; Swan et al., 2000). A content analysis of online discussion at graduate level by Polhemus et al. (2001) also suggests that discussions become more complex when a higher degree of affective communication is used to reduce a virtual gap among participants. Based on this literature review, the following hypotheses are proposed.

H_1 There is a significant difference in the expression of social presence between male and female students.

$H_{1.1}$ There is a significant difference in active participation in class discussion between male and female students.

$H_{1.2}$ There is a significant difference in learning outcomes between male and female students.

H_2 Social presence is positively related to active participation in class discussions of online students in OLCs.

H_3 Social presence is positively related to learning outcomes of online students in OLCs.

H_4 Active participation in class discussion is positively related to learning outcomes of online students in OLCs.

Figure 18 Hypotheses for main study (Part II)

To test the above hypotheses, various statistical methods are used. The next section describes these methods as well as the procedures in greater detail.

8.3 Methods

In this study, conferencing messages from two different cohorts posted by online students (N=32) were utilised. In particular, the social presence indicators expressed by online students found in content analysis (see Chapter 7) were used to test the proposed hypotheses. Three other variables included in hypothesis testing were obtained. Gender was based on students who participated in the study. Active participation in an online class was based on the number of messages posted by online students in each module while the learning outcomes were based on the final examination score in each module.

An independent samples t-test was used to compare the mean score of social presence between two groups of students based on their gender. To understand more about how gender might affect learning in OLCs, differences in such factors as active participation and learning outcomes between males and females were tested using the t-test. Multiple regression analysis was also applied to examine the quantitative relationship between social presence expressed by online students (as the independent variables) and active participation as well as learning outcomes (as the dependent variables). Finally, a simple regression technique was applied to determine the association between learning outcomes and active participation in an online class.

8.3.1 Assumption testing

To perform statistical techniques, several assumptions about the data should be met. In this study, such basic assumptions as sample size, normal distributions, and homogeneity of variance were performed for the independent samples t-test. For regression analysis, such additional tests as multicollinearity were also conducted. The following sections describe these in detail.

8.3.1.1 Independent samples t-test

Sample size

To perform an independent sample t-test, a sufficient sample size is important. With a small sample, violations of the test assumptions can be difficult to detect. A small sample size (N<30) may also result in inadequate power to show a significant difference between the two samples. In this study, the sample size (N=128) used was generated from the number of observations across eight modules of online students who agreed to participate in this part of the research.

Level of measurement and independence of observations

Like other parametric tests, the t-test assumes that the dependant variable is measured on an interval or ratio level. Observations also need to be independent of each other. The dependent variables used in this study (e.g., number of messages and score) were based on either interval or ratio level. However, since the study was based on groups of students who interacted in OLCs, it was possible that the assumption of independence was violated. As noted by Pallant (2001), "there are a number of research situations that may violate this assumption of independence….Any situation where the observations or measurements are collected in a group setting, or subjects are involved in some form of interaction with one another, should be considered suspect" (p. 171). To minimise the impact of this problem, this study applied a more stringent alpha value (e.g., p<.01) for the results as suggested by Steven (1996, in Pallant, 2001).

Normal distribution and homogeneity of variance

Such statistical analysis as the t-test assumes that data come from a population whose distributions are normal and whose variances are equal. Normality can be assessed using various techniques, including the test of normality and histograms (see Appendix M).

The test showed that the differences between males and females were not normally distributed. However, according to Pallant (2001), the violation of this assumption, particularly in social science research "does not necessarily indicate a problem with the scale, but rather reflects the underlying nature of the construct being measured" (p. 59). She also adds, "most of the techniques are reasonably 'robust' or tolerant of violations of this assumption. With large enough sample sizes… the violation of this assumption should not cause any major problems" (p. 172). For the homogeneity of variance, a Levene's test for equality of variances produced as part of the t-test tables allows this assumption to be observed. Similarly, an analysis of variance is reasonably robust to violations of this assumption. If equal variance is assumed (p>.05), another set of results generated by the Levene's test could be used.

8.3.1.2 Regression analysis

Sample size

There is no consensus on the size of the sample as different authors present different guidelines for the number of cases needed for multiple regression. Ball (1965) suggests that ten observations per independent variable are a minimum requirement for regression. Tabachnick and Fidell (2001) provide a formula N >= 104 + m (where m = number of independent variables) for calculating sample size requirements. However, for stepwise regression, a ratio of 40 cases for each independent variable is a rule of thumb to be able to generalise findings from the study. Accordingly, the observations (N=128) used in this study seem to be enough for generalisation.

Normality, linearity, and homogeneity of variance

Regression analysis also assumes that variables have normal distributions. It also assumes linear relationships between the dependent variable and independent variables. Non-normal distribution and non-linear relationships of variables can cause misrepresentation or underestimation of the true relationships. Normality and linearity can be checked from the normal probability plots of the regression standardised residuals and the scatterplots obtained from the analysis (see Appendix M). The presence of outliers of dependent variables was also identified from the scatterplots. Usually, standardised residual values above 3.3 or less than –3.3 are categorised as outliers (Tabachnick & Fidell, 2001). Homogeneity of variance, or homoscedasticity, should be tested to see whether the residuals are generally dispersed throughout the range of the

dependent variable. In this study, all these assumptions were tested but no major violation was found.

Multicollinearity

Multicollinearity is the inter-correlation among the independent variables existing when two or more independent variables in a model are highly correlated with each other. These high correlations can cause problems when drawing inferences about the relative contribution of each variable to the model. To detect multicollinearity, tolerance and the variance-inflation factor (VIF) values are computed as outputs from regression analyses. Tolerance can be calculated by the formula 1 - R^2 for each variable. Low tolerance values (e.g., less than .20) suggest the possibility of multicollinearity among the variables. This assumption can also be detected from VIF values, the reciprocal of tolerance. High VIF values indicate high multicollinearity and unreliability of beta coefficients. In this study, the values for all independent variables were very acceptable and no violation of this assumption was found. Both tolerance and VIF values are reported in collinearity statistics columns in each regression analysis section.

8.4 Findings

8.4.1 Comparative tests

8.4.1.1 Social presence and gender

To test the first hypothesis, an independent samples t-test was conducted to compare the mean scores of males and females on each social presence indicator. Table 17 shows that the difference in the use of humour (t=3.090, df=125.36, p=.002) between males and females was the most statistically significant (p<.01). The other social presence indicators that were significantly different (p<.05) were emotion (t=2.493, df=115.33, p=.014), personal values (t=1.986, df=126, p=.049), self-disclosure (t=1.939, df=125.82, p=.050), and inquiry (t=2.114, df=113.45, p=.037).

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Emotion	Equal variances assumed	5.946	.016	2.335	126	.021	13.0296	5.57980	1.98738	24.0719
	Equal variances not assumed			2.493	115.335	**.014**	13.0296	5.22641	2.67744	23.3818
Humour	Equal variances assumed	14.832	.000	2.743	126	.007	8.3466	3.04253	2.32550	14.3676
	Equal variances not assumed			3.090	125.358	**.002**	8.3466	2.70110	3.00091	13.6922
Personal values	Equal variances assumed	.184	.668	-1.986	126	**.049**	-12.8799	6.48469	-25.713	-.04686
	Equal variances not assumed			-1.996	97.654	.049	-12.8799	6.45375	-25.688	-.07206
Self-disclosure	Equal variances assumed	8.076	.005	1.709	126	.051	6.5152	3.81179	-1.02818	14.0586
	Equal variances not assumed			1.939	125.818	**.050**	6.5152	3.35950	-.13321	13.1637
Group reference	Equal variances assumed	.648	.422	-.559	126	.577	-2.9547	5.28220	-13.408	7.49860
	Equal variances not assumed			-.547	89.589	.586	-2.9547	5.40569	-13.695	7.78531
Phatics	Equal variances assumed	.062	.803	.487	126	.627	2.1569	4.42935	-6.60863	10.9225
	Equal variances not assumed			.473	87.816	.638	2.1569	4.56201	-6.90938	11.2232
Salutation/Closure	Equal variances assumed	.086	.770	-1.415	126	.159	-9.8382	6.95142	-23.595	3.91847
	Equal variances not assumed			-1.401	93.366	.164	-9.8382	7.02012	-23.778	4.10166
Vocatives	Equal variances assumed	1.508	.222	1.285	126	.201	7.9071	6.15452	-4.27250	20.0867
	Equal variances not assumed			1.329	106.400	.187	7.9071	5.94870	-3.88624	19.7005
Acknowledgement	Equal variances assumed	.687	.409	.873	126	.384	5.3067	6.07977	-6.72498	17.3384
	Equal variances not assumed			.890	101.988	.376	5.3067	5.96367	-6.52223	17.1356
Agreement/Disagreement	Equal variances assumed	.029	.865	.036	126	.971	.1544	4.26865	-8.29312	8.60192
	Equal variances not assumed			.036	92.466	.972	.1544	4.32432	-8.43350	8.74230
Help/Assistance	Equal variances assumed	3.739	.055	1.210	126	.229	5.5175	4.56098	-3.50855	14.5435
	Equal variances not assumed			1.315	119.724	.191	5.5175	4.19610	-2.79068	13.8257
Inquiry	Equal variances assumed	4.543	.035	1.994	126	.048	11.7634	5.90039	.08668	23.4401
	Equal variances not assumed			2.114	113.455	**.037**	11.7634	5.56536	.73787	22.7889
Invitation	Equal variances assumed	1.735	.190	.597	126	.551	1.4822	2.48165	-3.42892	6.39330
	Equal variances not assumed			.619	107.081	.537	1.4822	2.39317	-3.26195	6.22633

Table 17 Independent samples t-test for social presence between genders

A further examination of the findings revealed that females used more emotion, humour, and self-disclosure in their messages than males did. In contrast, male students expressed their personal values and ideas more significantly than female students did. A slight difference, yet not statistically significant, was also found between the two groups in terms of social presence usage. The findings indicated that female students expressed more social presence than male students did on almost all indicators (see Appendix O). Therefore, Hypothesis 1, stating that there is a difference in the expression of social presence between males and females, was substantiated.

8.4.1.2 Gender and active participation

To test Hypothesis 1.1, the difference between genders in the number of contributions to online class discussion was investigated. An independent samples t-test was applied to compare the difference in means between the two groups. The findings are reported in Table 18.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Number of messages	Equal variances assumed	1.458	.230	-.995	126	.321	-.95	.951	-2.830	.936
	Equal variances not assumed			-.949	82.954	.345	-.95	.998	-2.932	1.038

Table 18 Independent samples t-test for active participation between genders

Based on the results from the t-test, a slight difference, although not statistically significant, was found between male students (M=5.64, SD=5.77) and female students (M=4.69, SD=4.82) in terms of active participation in an online class (t=.995, df=126, p=.321). However, Hypothesis 1.1 stating that there is a significant difference in active participation between males and females was statistically rejected.

8.4.1.3 Gender and learning outcomes

To test Hypothesis 1.2, the relationship between gender and learning outcomes was also examined using an independent samples t-test (Table 19).

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Score	Equal variances assumed	.623	.432	-.077	119	.939	-.12	1.605	-3.300	3.054
	Equal variances not assumed			-.074	83.763	.941	-.12	1.656	-3.415	3.169

Table 19 Independent samples t-test for learning outcomes between genders

Although the findings revealed that male and female students were statistically significantly different on some social presence indicators, no significant differences were found between males (M=61.69, SD=9.18) and females (M=61.57, SD=8.13) in terms of learning outcomes in this study (t=.077, df=119, p=.939). Therefore, Hypothesis 1.2 stating that there is a significant difference in successful learning outcomes between males and females was rejected.

8.4.2 Predictive tests

8.4.2.1 Social presence and active participation

To test Hypothesis 2, a standard multiple regression was performed to see whether the level of social presence expressed by online students is related to their participation in online discussions. In particular, the hypothesis aimed to investigate whether social presence indicators (e.g., emotion, humour, etc.) have a positive correlation to active participation, represented by the number of messages posted to the class discussions by online students.

Such assumptions as normality, linearity, homoscedasticity, and multicollinearity were examined to ensure the fitness of the model. These assumptions can be observed from the scatterplots and the normal probability plots of the standardised residuals (see Appendix M). The scatterplots with the majority of residuals grouped in the centre of the plot and the fairly straight diagonal lines from bottom-left to top-right indicated no major violation from these assumptions. The multiple regression model used to investigate the relationship between social presence indicators and active participation is described as follows:

$$Y_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3} + \beta_4 X_{\iota 4} + \beta_5 X_{i5} + \beta_6 X_{i6} + \beta_7 X_{i7} + \beta_8 X_{i8} + \beta_9 X_{i9} + \beta_{10} X_{i10} + \beta_{11} X_{i11} + \beta_{12} X_{i12} + \beta_{13} X_{i13} + \varepsilon_i$$

where:

Y_i = Number of messages

X_{i1} = Emotion

X_{i2} = Humour

X_{i3} = Personal values

X_{i4} = Self-disclosure

X_{i5} = Group reference

X_{i6} = Phatics

X_{i7} = Salutation/Closure

X_{i8} = Vocatives

X_{i9} = Acknowledgement

X_{i10} = Agreement/Disagreement

X_{i11} = Help/Assistance

X_{i12} = Inquiry

X_{i13} = Invitation

The regression model was tested and the overall statistical significance emerged ($F=2.992$, $df=13, 114$, $p<.001$). The model summary presented in Table 20 shows the R^2 and adjusted R^2 values of this model.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.504[a]	.254	.169	4.729

a. Independent Variable: (Constant), Invitation, Acknowledgement, Humour, Group reference, Self-disclosure, Phatics, Personal values, Help/Assistance, Agreement/Disagreement, Salutation/Closure, Inquiry, Emotion, Vocatives

b. Dependent Variable: Number of messages

Table 20 Model summary: Social presence vs. active participation

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	869.658	13	66.897	2.992	.001[a]
	Residual	2549.147	114	22.361		
	Total	3418.805	127			

a. Independent Variable: (Constant), Invitation, Acknowledgement, Humour, Group reference, Self-disclosure, Phatics, Personal values, Help/Assistance, Agreement/Disagreement, Salutation/Closure, Inquiry, Emotion, Vocatives

b. Dependent Variable: Number of messages

Table 21 Analysis of variance: Social presence vs. active participation

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	2.176	.866		2.514	.013		
	Emotion	4.278E-03	.019	.026	.229	.819	.527	1.899
	Humour	2.464E-03	.030	.008	.082	.934	.682	1.467
	Personal values	2.988E-02	.015	.206	2.056	.042	.651	1.535
	Self-disclosure	5.279E-02	.025	.213	2.101	.038	.636	1.573
	Group reference	4.156E-02	.018	.230	2.267	.025	.635	1.575
	Phatics	-3.277E-02	.021	-.152	-1.537	.127	.668	1.497
	Salutation/Closure	-5.342E-03	.014	-.039	-.377	.707	.607	1.648
	Vocatives	1.281E-02	.031	.083	.408	.684	.158	6.330
	Acknowledgement	-6.446E-03	.030	-.041	-.213	.832	.175	5.701
	Agreement/Disagreement	-1.204E-02	.024	-.054	-.502	.616	.570	1.754
	Help/Assistance	1.456E-02	.021	.070	.694	.489	.645	1.551
	Inquiry	-1.839E-02	.017	-.115	-1.105	.271	.600	1.666
	Invitation	8.484E-02	.036	.221	2.366	.020	.751	1.331

a. Dependent Variable: Number of messages

Table 22 Coefficients: Social presence vs. active participation

The results shown in Table 22 revealed that four independent variables, personal values (beta=.206, p=.042), self-disclosure (beta=.213, p=.038), group reference (beta=.230, p=.025), and invitation (beta=.221, p=.020), were significant variables in this model. Significant variables with standardised coefficients suggested that the model explained approximately 25 percent of the variance in the number of messages (Table 20). The remaining 75 percent of the unexplained variance might come from factors that were not included in this study. Of these four variables, group reference made the largest contribution to explaining participation in an online class, followed by invitation, self-disclosure, and personal values. Based on these findings, Hypothesis 2 stating that the degree of social presence is positively related to active participation among online students in class discussions was partially substantiated.

8.4.2.2 Social presence and learning outcomes

To test research hypothesis 3, a multiple regression analysis was also performed to see whether the level of social presence expressed by online students is positively related to learning outcomes represented by their final examination scores. The regression model used to examine the relationship between these variables is described as follows:

$$Y_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i3} + \beta_4 X_{i4} + \beta_5 X_{i5} + \beta_6 X_{i6} + \beta_7 X_{i7} + \beta_8 X_{i8} + \beta_9 X_{i9} + \beta_{10} X_{i10} + \beta_{11} X_{i11} + \beta_{12} X_{i12} + \beta_{13} X_{i13} + \varepsilon_i$$

where:

Y_i	=	Examination score
X_{i1}	=	Emotion
X_{i2}	=	Humour
X_{i3}	=	Personal values
X_{i4}	=	Self-disclosure
X_{i5}	=	Group reference
X_{i6}	=	Phatics
X_{i7}	=	Salutation/Closure
X_{i8}	=	Vocatives
X_{i9}	=	Acknowledgement
X_{i10}	=	Agreement/Disagreement
X_{i11}	=	Help/Assistance
X_{i12}	=	Inquiry
X_{i13}	=	Invitation

The regression model was tested, but no statistical significance was found ($F=1.355$, $df=13, 107$, $p=.194$). The model summary shown in Table 23 shows the R^2 and adjusted R^2 values of this model.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.376[a]	.141	.037	8.337

a. Independent Variable: (Constant), Invitation, Acknowledgement, Humour, Group reference, Self-disclosure, Phatics, Personal values, Help/Assistance, Agreement/Disagreement, Salutation/Closure, Inquiry, Emotion, Vocatives

b. Dependent Variable: Examination score

Table 23 Model summary: Social presence vs. learning outcomes (Model 1)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1224.006	13	94.154	1.355	.194[a]
	Residual	7436.737	107	69.502		
	Total	8660.744	120			

a. Independent Variable: (Constant), Invitation, Acknowledgement, Humour, Group reference, Self-disclosure, Phatics, Personal values, Help/Assistance, Agreement/Disagreement, Salutation/Closure, Inquiry, Emotion, Vocatives

b. Dependent Variable: Examination score

Table 24 Analysis of variance: Social presence vs. learning outcomes (Model 1)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	60.419	1.560		38.73	.000		
	Emotion	1.662E-02	.034	.061	.491	.625	.527	1.899
	Humour	-4.283E-02	.054	-.086	-.790	.431	.682	1.467
	Personal values	4.676E-02	.026	.197	1.774	.079	.651	1.535
	Self-disclosure	4.927E-02	.046	.121	1.081	.282	.636	1.573
	Group reference	-8.953E-03	.033	-.030	-.269	.788	.635	1.575
	Phatics	1.153E-02	.039	.033	.298	.766	.668	1.497
	Salutation/Closure	-3.672E-03	.026	-.016	-.143	.887	.607	1.648
	Vocatives	2.962E-02	.057	.117	.521	.604	.158	6.330
	Acknowledgement	9.402E-02	.055	.367	1.714	.089	.175	5.701
	Agreement/Disagreement	7.113E-02	.043	.194	1.637	.105	.570	1.754
	Help/Assistance	2.219E-02	.038	.065	.583	.561	.645	1.551
	Inquiry	-2.759E-02	.030	-.106	-.914	.363	.600	1.666
	Invitation	1.506E-03	.065	.002	.023	.982	.751	1.331

a. Dependent Variable: Examination score

Table 25 Coefficients: Social presence vs. learning outcomes (Model 1)

Because no significance was found, a stepwise multiple regression using the backward deletion method was conducted. In this method, as in standard multiple regression, all social presence indicators were entered into the model simultaneously. However, the least significant indicator was then removed, one at a time, and the regression was re-

calculated. This process was repeated until only significant indicators remained in the model. After applying the backward selection approach, a stronger statistical significance emerged (F=4.730, df=3, 117, p=.004). The model summary shown in Table 26 also presents the R^2 and adjusted R^2 values of this model.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
2	.329[a]	.108	.085	8.125

a. Independent Variable: (Constant), Agreement/Disagreement, Personal values, Acknowledgement

b. Dependent Variable: Examination score

Table 26 Model summary: Social presence vs. learning outcomes (Model 2)

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
2	Regression	936.716	3	312.239	4.730	.004[a]
	Residual	7724.028	117	66.017		
	Total	8660.744	120			

a. Independent Variable: (Constant), Agreement/Disagreement, Personal values, Acknowledgement

b. Dependent Variable: Examination score

Table 27 Analysis of variance: Social presence vs. learning outcomes (Model 2)

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
2	(Constant)	60.463	1.344		44.99	.000		
	Personal values	4.813E-02	.021	.203	2.264	.025	.951	1.051
	Acknowledgement	6.576E-02	.025	.256	2.663	.009	.822	1.217
	Agreement/Disagreement	7.692E-02	.036	.210	2.157	.033	.804	1.243

a. Dependent Variable: Examination score

Table 28 Coefficients: Social presence vs. learning outcomes (Model 2)

Significant variables with standardised coefficients are presented in Table 28. The results suggested that the model, which includes personal values, acknowledgement, and agreement/disagreement, explained approximately 11 percent of the variance in successful learning outcomes (Table 26). The remaining percentage of the unexplained variance could be the result of such other factors as students' educational background and work experience, which are beyond the scope of this study. Of these three variables, acknowledgement made the largest contribution (beta=.256, p=.009) although

agreement/disagreement and personal values also yielded a statistically significant contribution (beta=.210, p=.033 and beta=.203, p=.025, respectively) to explaining active participation in an online class. Based on the findings, Hypothesis 3 stating that the degree of social presence in the learning community is positively related to learning outcomes of online students in OLCs was partially substantiated.

8.4.2.3 Active participation and learning outcomes

Finally, based on the last hypothesis, a simple regression analysis was also performed to test whether active participation of online students in OLCs is positively related to the learning outcomes in such contexts. The regression model that was used to examine the relationship between these two variables is described as follows:

$$Y_i = \beta_0 + \beta_1 X_{i1} + \varepsilon_i$$

where:

Y_i = Examination score

X_{i1} = Number of messages

The regression model was tested and strong statistical significance was found (F=6.917, df=1, 119, p=.010). The model summary in Table 29 shows the R^2 and adjusted R^2 values of this model.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.234[a]	.055	.047	8.293

a. Independent Variable: (Constant), Number of messages

b. Dependent Variable: Examination score

Table 29 Model summary: Active participation vs. learning outcomes

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	475.791	1	475.791	6.917	.010[a]
	Residual	8184.953	119	68.781		
	Total	8660.744	120			

a. Independent Variable: (Constant), Number of messages

b. Dependent Variable: Examination score

Table 30 Analysis of variance: Active participation vs. learning outcomes

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	59.678	1.053		56.67	.000		
	Number of messages	.384	.146	.234	2.630	.010	1.000	1.000

a. Dependent Variable: Examination score

Table 31 Coefficients: Active participation vs. learning outcomes

Although the number of messages yielded a statistically significant contribution (beta=.234, p=.010) to explaining positive learning outcomes in an online class, the results suggested that the number of contributions to class discussion explained only about five percent of the variance in successful learning outcomes (Table 29). Based on the findings, Hypothesis 4 stating that active participation in class discussion is positively related to learning outcomes of online students in OLCs was statistically substantiated.

8.5 Summary and discussion

This section summarises and discusses the results from the statistical analyses reported in the previous section.

8.5.1.1 Social presence and gender

The current findings seem to support the hypothesis that there was a significant difference in the expression of social presence between genders. The results from the t-test showed that female students seemed to convey affective communication, such as emotion, humour, and self-disclosure, more than male students did. Although not statistically significant, the test also revealed that female students in this study expressed a higher degree of social presence. In particular, on more than two-thirds of the social presence indicators, females scored higher than males (see Appendix O). These findings were consistent with the results of other studies (e.g., Baskin & Barker, 2004) suggesting that females are more likely than males to put more emphasis on social communication and personal relationships. As Wallace (1999) notes, "women tend to show more orientation towards connectedness and relationships, more empathy, and more sensitivity to emotions and feelings of others" (p. 209). Moreover, disclosure of vulnerability and personal details was more frequently made by females than males in this study.

Messages posted by female students to the online discussion usually contained such phrases as "I am so confused" and "I am sorry".

In contrast, the findings showed that men seemed to be more task-oriented as they were likely to concentrate on the learning topics (Herring, 1993). From the study, a significant difference between males and females concerning the use of inquiry was also found. The findings suggested that females tended to use this social presence indicator to solicit answers and encourage contributions from other participants. The qualitative data from the previous chapter as well as the findings from other studies (e.g., Blum, 1999) conducted in online learning environments also supported this conclusion.

8.5.1.2 Gender and active participation

The findings from the t-test showed no statistically significant differences between males and females concerning the number of messages contributed to the class discussions. While the expression of social presence between genders was different, active participation did not seem to be influenced by this factor. This was probably because social presence is intrinsically related to gender whereas active participation may involve various factors both internal (e.g., self-motivation) and external (e.g., work commitment), rather than just gender itself. In many online programmes, class discussion is a requirement and is considered a part of the assessment. If that is the case, differences between the two groups in terms of active participation are less likely to be found. The findings that gender differences did not affect active participation could also be supported by the claim that learning in online environments creates equal opportunities for all members to participate (Hiltz & Wellman, 1997).

However, the current findings contradicted the results of many previous research studies (e.g., Barrett & Lally, 1999), arguing that men contribute to class discussions more than women do. A study on gender differences in asynchronous text-based learning by Blum (1999) also showed different results, indicating that men tended to dominate online discussions. Yet, there are discrepancies between the findings of earlier studies because some researchers reports that women are more active than men are in online learning. For instance, a study by Arbaugh (2000) on the effects of gender on learning and participation in an online MBA course revealed that female students posted more comments than their male counterparts.

So far, it seems that a definite conclusion cannot be drawn to indicate whether women are more active or less active in OLCs. Based on the current findings and those of previous studies, mixed results have been reported. Besides, the results of many studies (e.g., Arbaugh, 2000) showing a lack of consistently significant differences between genders could imply that both men and women have about the same level of participation in online settings. In some studies (e.g., Barrett & Lally, 1999), due to such limitations as a comparatively small sample size and a short period of study, the results are much less generalisable and it is necessary to be more cautious about their interpretation.

8.5.1.3 Gender and learning outcomes

Similarly, the literature so far shows no conclusive results on gender differences in cognitive performance (see Gunn et al., 2003; Richardson & French, 2000). Based on the findings from this study, no significant differences were found in terms of learning outcomes between males and females. The factors that contributed to a comparable performance between genders seemed to be the nature of the programme and the student body. All the students in this study were working professionals who wanted to upgrade their skills and knowledge in the field. They were mature and highly motivated, and tended to bring considerable knowledge to the class discussions, thus possibly affecting the learning outcomes. A similar result was found by Arbaugh (2000), who conducted a study with internet-based MBA students to compare their performance on learning using a pre-test/ post-test design. Although the whole class showed a significant improvement between pre- and post-test scores, no significant differences were found when the class was classified by gender. Similar results were also found in a study conducted by McSporran and Young (2001), who studied groups of online undergraduate students in an introductory course in Computing Systems. Interestingly, although women scored higher than men did in two assignments, the final examination revealed mixed results.

8.5.1.4 Social presence and active participation

Previous studies show that social presence is positively related to social interaction among students in online settings (Tu, 2002; Tu & McIsaac, 2002a). Research done by Polhemus et al. (2001) also suggests that a high level of social presence has a positive impact on interaction in an online class in terms of both quantity and quality. In this study, regression analysis showed that the use of personal values, self-disclosure, group

reference, and invitation was significantly correlated to the number of messages posted to the class discussions. More particularly, these indicators were significant variables of active participation of students in an online class. The qualitative data from the previous chapter also suggested that the expression of personal values and ideas derived from unique backgrounds and experiences helped to create communication that increased dynamic feedback from the other class members. The more critical contributions that were exchanged, the higher the quality of the discussions and the deeper the cognitive comprehension, and thus possibly, there was an enhancement of the learning outcomes.

In addition, self-disclosure was also found to stimulate active participation in online discussions, especially at the early stage of community development. The qualitative data indicated that students who revealed their vulnerability and stories about themselves were likely to gain more support and feedback from their class members. This process not only helped them improve their understanding of the subject matter, but also encouraged them to further discuss the learning topics in more detail. The findings were also supported by social penetration theory (Altman & Taylor, 1973; Cozby, 1972) suggesting that people develop a higher level of trust and relationships when they reveal more about themselves. According to this theory, self-disclosure has a mutual consequence. The more people disclose, the more reciprocity they receive, which results in an increase in overall participation. However, it is also possible that some students keep asking for help without making any valuable contribution. If that is the case, excessive or inappropriate self-disclosure can lead to a counter-productive learning process (see Forgas & Laham, 2004).

Regression analysis showed that group reference is a significant variable that is positively related to active participation in an online class. The use of inclusive pronouns signifying a sense of belonging and group cohesion encouraged online members to contribute more actively as they felt that they were a part of the group and committed to the group task. The qualitative data from the previous chapter helped support these findings. Finally, it is likely that the use of invitation promoted active participation in online discussions in which both tacit and explicit knowledge could be exchanged. This social presence indicator was important and could be used to encourage involvement, especially in the early stages of online discussions. The quantitative findings from content analysis showed that the contributions from online students were typically lowest

in the first week when the new module started. One of the reasons why students did not participate was possibly because they were unfamiliar with various factors, such as a new environment, people, technologies, and learning content (Harasim et al., 2001, see also Wegerif, 1998). Perhaps, they might feel reluctant to initiate a discussion and prefer to 'lurk' for a while before participating (Salmon, 2000).

In these circumstances, social presence (e.g., invitation), which helped motivate people to participate, was considered a key to active online discussions. Online tutors could play an important role to facilitate this process (Harasim et al., 2001). The qualitative data suggested that they often performed as a model for dynamic participation by starting the discussion thread and eliciting students' contributions using various social presence indicators, including invitation and inquiry. The input from the first student(s) who followed the thread then helped encourage the others to take part, and thus vibrant discussions developed. Encouraging other class members to express their views or to share their knowledge generated at least two positive results. First, it allowed people to maintain their social presence by being active in online activities. Second, it helped sustain a collaborative learning environment in which people dynamically engaged. Without continuing active participation from class members, OLCs could easily disappear.

8.5.1.5 Social presence and learning outcomes

Social presence is one of the important factors related to learning. The purpose of OLCs, in which social presence is an essential element, is associated not only with active social interaction but also with expected cognitive results (Garrison & Anderson, 2003; Stacey, 2002). Based on the results of regression analysis, positive correlations among the three social presence indicators (personal values, acknowledgement, and agreement/ disagreement) and the final examination score indicated that these factors were significant variables that had a positive relationship with learning outcomes.

The expression of personal values did not merely reflect a sense of social presence, but it also had a significant impact on the performance of learning in an online class. These values were based on personal knowledge and deeply rooted in an individual's experiences, interpretations, and understandings. The exchange of such knowledge among students in the form of personal views and ideas was important for the knowledge

construction process. From the study, personal values could also be presented by agreeing or disagreeing with ideas expressed by other members. The exhibition of agreement or disagreement along with analytical discussions allowed online students to develop more complex ideas through further investigation and reflection. With the different perspectives they brought from their academic backgrounds and real-world experiences, online students started negotiating their meanings in a deeper fashion and developing a higher degree of cognitive outcomes.

Finally, the results also showed that acknowledgement was a significant variable that had a positive relationship with the learning outcomes of online students. Acknowledgement as an interactive indicator performed two major functions important in supporting learning in OLCs. Acknowledging others' messages not only maintained a sense of presence in a discussion, but also encouraged the formation of a supportive learning environment that was important for effective learning processes and outcomes. The qualitative data from the previous chapter showed that the use of acknowledgement created in-depth discussion and knowledge sharing, which allowed students to develop an ability to better understand the subject matter from various perspectives.

The findings that only three indicators were significant variables of positive learning performance were probably because the relationship between social presence and cognitive learning is less clear. As Fayer, Gorham, and McCroskey (1993) note, "the intuitive link between immediacy and cognitive learning is less straightforward, partially because cognitive gain in [*sic*] generally assessed through measures of recall, synthesis, and application of information transmitted verbally; while relationship information is transmitted nonverbally, content information is transmitted verbally" (p. 113). Therefore, Richmond et al. (1987) suggest the use of students' perceptions of their own learning as a measurement of cognitive learning. Using this method, according to Fayer et al. (1993), substantial associations between teacher immediacy and cognitive learning were found.

Although social presence seems to have a positive impact on learning, it is also possible that too much social presence can lead to a negative learning experience, and there must be a proper level of usage of social presence. McCroskey and Richmond (1992) suggest that moderate social presence is necessary for cognitive development. While low social

presence may restrain effective learning, high social presence may not create more effective learning than that generated by moderate social presence. They confirm this notion by stating that "a moderate amount of immediacy may be crucial to attain a moderate amount of cognitive learning, but increased immediacy beyond that level may have little more positive impact. It may even be that there is a point at which the teacher can have 'too much' immediacy" (p. 109). Rourke et al. (2001a) also note, "although we postulate that fairly high levels of social presence are necessary to support the development of deep and meaningful learning, we expect that there is an optimal level, above which too much social presence may be detrimental to learning" (p. 67). In a study to examine the relationship between students' perception of social presence and performance in an online course, Picciano (2002) found that a high degree of social presence had a slight inverse result, though not statistically significant, to students' performance on the examination score.

Moreover, in online teaching and learning processes, various factors potentially contribute to students' performance and successful learning outcomes. Such factors as study habits, previous knowledge, communication skills, time available for study, and teacher effectiveness can all have an effect on learning (Picciano, 2002). Although a grade can provide a tangible and prevalent measure of learning outcomes (Hiltz & Wellman, 1997), it is not the only evidence of what students have learned. As Rovai and Barnum (2003) state, "the use of grades to operationalize learning may not always provide the best results….Students may already know the material when they enroll or their grade may be more related to class participation, work turned in late, or attendance than to learning" (pp. 60-61). They further note, "grades may not be a reliable measure of learning, particularly for the authentic performance tests that are valued in constructivist learning environments, as different teachers and even the same teachers over time are unlikely to assign grades consistently. Therefore, using grades as a measure of cognitive learning can be problematic" (p. 61).

8.5.1.6 Active participation and learning outcomes

Actively engaging in class discussions enhances not only the effectiveness of the learning process, but also the cognitive outcomes of online students (McConnell, 2000). In this study, a positive correlation between active participation, represented by the number of messages posted by online students, and their final examination scores was

found. This was consistent with the results from previous studies that indicated a positive relationship between these two variables. For example, a study conducted by Long and Javidi (2001) to examine student performance in online learning showed that the frequency of online participation influenced positive examination results and had a strong correlation with the overall grade point average. Similarly, a study by Picciano (2002) also revealed a positive correlation between actual participation in online class discussions and student performance in the examination.

Having said that, positive learning outcomes in online settings are based on not only the level of participation, but also some other factors (Picciano, 2002). In a study of student interaction and online course effectiveness, Rovai and Barnum (2003) state, "the data from the present study provide only limited evidence to suggest that students who participate in course discussions less than others perceive that they learn less. Other variables are also likely to be important" (p. 71). In addition, although this current study focused on objective measures (e.g., examination) to evaluate the learning performance, successful learning outcomes sometimes simply cannot be measured in numbers. In reality, intangible benefits, such as learning satisfaction as well as personal and social development, are also of considerable importance (Palloff & Pratt, 2003). Besides, the desirable learning outcomes and the degree of learning success can be different from one student to another. Some students might just want to obtain good examination results while others value the knowledge gained from discussions and long-term relationships developed in class.

8.6 Conclusion

This chapter has reported the findings from the second part of the main study. It aimed to address the research question by investigating the relationship between social presence and other factors related to learning in an online environment. Quantitative analysis using various statistical techniques was applied to obtain a better understanding of how social presence elements were related to such factors as gender, active participation, and cognitive learning outcomes.

The findings suggested that gender differences influenced communication patterns and social presence expressions of online students. Women tended to show affective responses and ask more questions while men tended to express their personal values and

focus on the tasks at hand. Similar findings were also found in earlier research. However, it could be seen that gender differences did not have a significant impact on active participation and learning outcomes in such a context. These findings seemed both to support and contradict previous empirical results. In fact, no firm conclusion on gender differences concerning participation and performance in online learning could be drawn from the earlier studies. Therefore, it could be argued that effective learning in OLCs was the result of various factors, or a combination of various factors, rather than gender itself. In contrast to gender, some social presence indicators (e.g., personal values) were significant variables that had positive relationships with both active participation and learning outcomes in such contexts. These results were consistent with those from previous studies showing that social presence has a positive impact on online learning.

From the study, social presence seems to play an important part in helping online participants to create a collaborative OLC in which an effective learning process and outcomes take place. Rather than an individual task, creating such an environment is a collective process in to which every online participant, both students and tutors, needs to put enough effort. OLC building also requires strategies that pay more attention to social aspects of learning, and thus contributes to a constructive learning process and outcomes. Participants can encourage and maintain both social exchange and intellectual contributions via expressions of social presence throughout the learning process. Based on the current findings, online tutors are in a strong position to facilitate these learning activities. They can serve as a model for online students to create dynamic class discussions and to develop a culture of collaborative learning in such a context.

This study has provided useful information and several implications for improving teaching and learning processes in OLCs. The regression model developed in the study was a practical technique used to explore the relationship between social presence and other factors associated with learning in such contexts. However, this study also had certain limitations that needed to be taken into account when interpreting the results. Since the data were collected from online participants involved in social interaction and group discussions, it was possible that the observations were dependent, and thus violated an assumption of the independent samples t-test. To reduce the effect of this problem, a more stringent p-value was also applied. For regression analysis, some significant variables (e.g., educational background, working experience, etc.) that could

help explain social presence in online learning were not included in the model. To lessen this limitation and enhance the predictive power of the model, these data should be incorporated into future research.

CHAPTER 9

Summary and conclusions

This chapter provides the overall summary and conclusions of the thesis. It starts with a summary of the research, and then presents its major contributions to the research field. An evaluation of the research findings, tools, and methods is offered, as well as the strengths and weaknesses of this research. The overall conclusions drawn from the three empirical studies are also described. Finally, the potential future research directions are provided.

9.1 Summary of research

The goal of this research was to gain a better knowledge of social presence in online learning contexts and fill the existing gaps (see Section 1.5) of social presence research. The research was composed of three empirical studies – preliminary study, main study (part I), and main study (part II). A summary of the research and key findings found in each study are provided in the following sections.

9.1.1 Preliminary study

The aim of the preliminary study was to confirm an understanding obtained from the literature and acquire a first-hand knowledge of the research context. Two surveys using online questionnaires were conducted to collect data. The study confirmed the assumption that social interaction among online participants is important for learning in OLCs. The study also showed that such social factors as identity, trust, and personal relationships were considered key foundations of social interaction in such contexts. These factors were able to be established without limitations imposed by constraints (e.g., distance and time zones) although more time was needed compared to face-to-face situations. Finally, face-to-face interaction confirmed its importance for online social interaction and learning. It acted as the first point where participants in OLCs introduced themselves and created identity among each other. It also helped them form an initial

stage of trust and personal relationships that became more important for later online discussions and knowledge sharing.

The findings from this preliminary study provided a better idea of OLCs, in which social interaction played a vital role. However, it was argued that social interaction alone was not always enough to create a positive online learning experience. The concept of social presence must be introduced to promote active and constructive interaction among online participants. This provided the ground for further investigation of this social element in such contexts.

9.1.2 Main study (Part I)

The literature suggests that social presence can be developed in online learning environments but how such a feeling is created still needs further examination (Swan, 2002). Previous studies (e.g., Swan, 2002) cannot provide such information, as they are too short (e.g., 12 weeks) for such a complex process as online social presence development to be observed. Using a longitudinal approach and content analysis allowed social presence to be examined over time and provided a clearer view of how participants developed their sense of presence in online learning contexts.

The study revealed that affective responses were needed the most at the initial phase of OLC development. This suggested that online participants should pay a great deal of attention to the creation of a supportive environment that encouraged social and affective communication right at the beginning of the programme. However, cohesive responses took longer to develop. This provided evidence to support prior research (e.g., Walther, 1992) suggesting that social relationships and group cohesion need more time to establish online. For that reason, online participants must be patient and understand that this process does not happen instantly. The findings that both affective and cohesive responses declined after their peak usage reflected the idea that social communication was less important after online students developed a relationship up to a level that was sufficient for effective collaboration in an online setting (see Rourke et al., 2001a). This could also imply that online students focused less on such communication and became more task-oriented. Having said that, social communication was needed all the way through the online learning process in order to maintain their presence and relationship. Unlike affective and cohesive responses, the study indicated that interactive responses

were used constantly throughout the programme. A possible explanation was that online students in this study were highly motivated and self-directed towards completing their course and assignments.

For online tutors, although the development of social presence could not be observed, content analysis showed very similar patterns of social presence expression in each module. The study revealed that online tutors frequently used such affective indicators as emotion to create an environment favourable to the learning process. This suggested that online tutors in this programme valued an atmosphere that encouraged social communication, allowed students to get to know each other, and made them feel comfortable sharing knowledge. Moreover, the findings that such interactive indicators as help/assistance were very common emphasised the important role of online tutors as facilitators who supported the learning process in OLCs.

This study did not only provide a better understanding of how social presence developed among online participants, but also filled the research gaps by allowing social presence to be examined over time. It was conducted in an environment that it was hoped would reflect true characteristics of OLCs that allowed the results to be applied to other online learning contexts. The data (i.e., conferencing messages) were also gathered and analysed in an unobtrusive manner using content analysis, which helped to avoid any potential or actual influence on the learning process and social occurrence in such environments.

9.1.3 Main study (Part II)

Because the existing knowledge on social presence in relation to learning in OLCs is still limited because little research has been done in this area, the second part of the main study was carried out. Data from content analysis derived from the first part were examined using such statistical techniques as t-test and regression analysis to test the hypotheses in which social presence indicators were used as both dependent and independent variables.

This study revealed that gender had an influence on communication style and the expression of social presence in OLCs. The findings suggested that online participants, especially tutors, should pay great attention to gender differences in online learning

contexts. Some previous studies (e.g., Savicki et al., 1996) recommend considering "gender composition" when forming groups for online discussions. While social presence was different between genders, this study suggested that active participation and learning outcomes in OLCs did not seem to be affected by this factor. These findings appeared both to support and contradict previous studies. Put more simply, no definite conclusion on gender in online learning could be drawn from the earlier literature so far. Nevertheless, this issue is worthy of further investigation.

The regression analysis provided evidence to support earlier research (e.g., Picciano, 2002) indicating that social presence is positively related to the learning process and outcomes of students in online classes. In particular, the study suggested that online tutors should encourage the creation of a learning environment that encouraged students to express such social presence as personal values and agreement or disagreement, which had a positive impact on active participation and learning performance. Although social presence should be promoted among online students, excessive use (e.g., too much self-disclosure) may create a negative impact on learning (Rourke et al., 2001a). If that is the case, what is an optimal level of social presence and how can it be identified? This certainly leaves much room for further study.

The study also showed that the number of messages students posted to the class discussions was positively related to their performance in the final examination. This finding suggested that online tutors needed to encourage active participation and knowledge sharing among online participants. Such techniques as assigning and rotating roles could be used to motivate active involvement in an online class (Harasim et al., 2001). However, it is necessary to keep in mind that successful learning outcomes are not the only results of the frequency of participation, but the quality and depth of ideas developed from dynamic discussions. Applying such statistical techniques as the t-test and regression analysis with data obtained from content analysis, as in this study, was a rather new approach to social presence research. However, the findings from the study provided a better understanding of social presence in relations to other important factors in online learning.

9.2 Contributions

This research has filled the key gaps (see Section 1.5) and has made three major contributions—longitudinal findings, a modified social presence measurement tool, and a methodological framework—to the existing body of knowledge in social presence research. The findings suggested several implications and benefits for both online learning researchers and practitioners, such as programme tutors, designers, and developers. This section discusses these contributions in more detail.

9.2.1 Longitudinal findings

This longitudinal study consisted of two complete four-module courses, which ran over a period of 48 weeks each, aiming to provide a better knowledge of social presence in OLCs. Although social presence in such contexts needs more explanation in terms of its development and impacts on the learning process and outcomes, little research has provided such information. The literature also suggests that social rapport in online environments needs a much longer period to establish, and thus requires long enough research to observe and understand its development online. A longitudinal study is, therefore, considered a practical method for examining online social presence and gaining a deeper understanding of it. In this research, the longitudinal study contributed a detailed knowledge of social presence to the field. Such information as social presence development can help to explain how online communities develop (and decline) over time. This allows researchers from various fields to apply the knowledge to understand other types of communities. Some of the findings that contradicted previous studies also suggested that there is substantial room for future research.

The findings from the longitudinal study showing that social presence was a significant factor in the learning process and outcomes have several implications for instructional design and teaching strategies. The findings raised an awareness of the social dimension of online learning and suggested that online tutors and practitioners should pay more attention to this component alongside pedagogy and content (Garrison & Anderson, 2003). This social aspect of learning is very important as students in an online context can be lonely, or even frustrated, because they have to work mostly on their own (Eastmond, 1995; Wegerif, 1998). This may have further implications for the

development of an OLC that provides a supportive learning environment in which students can engage in dynamic social interaction with others.

Another implication involves the importance of affective communication at the early phase of OLC development. Findings from Chapter 7 supported the idea that socioemotional communication is important when people start discovering potential among each other and developing an initial stage of personal relationships (Polhemus et al., 2001). Thus, providing a venue for social activities to occur is essential. Designers, developers, or tutors of an online course should consider arranging a face-to-face interaction at this stage (Garrison & Anderson, 2003). This is probably the best way to convey social presence and provide opportunities for people to create identity, trust, and personal relationships, which are basic components of online interaction. It can also be used to reinforce social connections among participants after they have been online. If it is not possible to organise a face-to-face meeting, developing a classroom homepage that contains images and profiles of online participants helps create a sense of presence (Garrison & Anderson, 2003). In such cases, online tutors should also encourage students to introduce themselves and share some personal information to create a welcoming environment (Palloff & Pratt, 1999).

Although online tutors should promote social communication among online participants, they need to understand that students can be different in learning and communication styles (see Section 5.5). The results from Chapter 8 that social presence was affected by gender supported this claim and have a potential implication for the formation of group discussions. Therefore, the impact of gender differences and the optimal composition of genders in an online class should be considered as another requirement for online instructional design (Savicki et al., 1996). In addition, online tutors and other practitioners need to understand that social engagement will not achieve its full potential until online participants develop a strong enough relationship that allows them efficiently to share their knowledge. Although this development can take longer in online contexts, tutors should play an active part supporting students, both socially and academically. The findings from content analysis that help/assistance was very common for online tutors in every module shed light on the importance of the facilitating role and provide an implication for the need of scaffolding for online students throughout the learning process.

9.2.2 Modified social presence measurement tool

Another contribution of this research is the modification of the tool to measure social presence. This tool was originally developed by a research team at the University of Alberta (Garrison et al., 2000; Rourke et al., 2001a) to assess the level of social presence in an online class. It was modified by the researcher to enhance its ability to analyse social presence and its development in online learning contexts (see Section 6.5.1). This is a useful instrument for online social presence, which has potential implications for both researchers and practitioners because a large number of courses are being developed and offered online. The social presence template applied in this research allows its users or other researchers to analyse social events and social content from computer conferencing or other text-based communication tools in a meaningful way. For example, researchers can apply the tool to investigate social presence at different levels of learning (e.g., undergraduate). Social presence patterns and its development can be observed in order to obtain a greater knowledge of the affective domain of online learning. Besides, the quantitative data derived from the analysis can be utilised further, using various statistical techniques, to examine the relationships between social presence and other variables.

The measurement tool also has several implications for practitioners attempting to improve online course design and implementation. Online tutors, for instance, can apply the template to analyse the lack of some social presence indicators that may benefit students' affective and cognitive learning in OLCs. They can use it as a checklist or a guideline for social interaction in such contexts. Other practitioners outside educational institutions will be able to apply the tool to non-educational settings to enhance group interaction and communication in organisations.

9.2.3 Methodological framework

Finally, this research has presented a functional methodological framework for analysing social presence in asynchronous text-based OLCs. The framework has laid the groundwork for further social presence studies in such contexts by providing useful information about the research process and practice. Because various techniques were applied, it was important to describe the underlying reasons why each technique was used and how it was performed to meet the research objectives and address the research questions.

A detailed framework of content analysis, such as the selection of recording unit, reliability testing, and social presence coding guidelines, was provided so that other researchers could repeat the processes and validate the findings. Methodological issues (i.e., subjectivity, generalisability, and ethical concerns) related to social presence study in online learning environments were also presented. The research also introduced an approach to investigating social presence in online learning that utilised data from quantitative content analysis and such statistical techniques as t-test and regression analysis. This certainly provided the basis for future work on the relationships between social presence and other factors related to learning in OLCs. Although applying this approach is new for social presence study, this research described several assumptions and criteria needed to perform these techniques, which can be used as a basic guideline for future research.

Combining a longitudinal study, content analysis, and various statistical techniques is a useful approach to investigating online social presence, as it provides a meaningful interpretation of such a social element. However, it is important to mention that some of these techniques, especially content analysis, require various processes and are very time-consuming. Content analysis is also exposed to a level of subjectivity, particularly when the interpretation of latent content is involved. Although content analysis is not new, its methodological framework applied in this study is rather innovative and unique in terms of the duration of the research.

It is impossible to discuss all the aspects of the framework and all the techniques applied in this research. However, the research aims to provide as much information as possible, allowing other researchers to apply it to reduce potential research limitations and enhance the reliability and validity of their findings.

9.3 Evaluation

9.3.1 Findings

Because of the limitations imposed by data protection concerns, this research made use of a single case study design that allowed the researcher to focus more thoroughly on various aspects of the case. Nevertheless, generalising results statistically from a single case study is often criticised by many researchers. To minimise the impacts from this

design, the researcher applied various strategies to make the findings more valid and generalisable.

Using content analysis, two sets of conferencing messages gathered from two different cohorts were analysed. The results from each cohort were then compared in order to draw the overall conclusions. Similar findings (e.g., social presence development and patterns of usage in each module) between the two cohorts emerged. Thus, a consistency of findings and a certain degree of generalisability could be claimed. To increase the generalisability, the findings obtained from the two cases were also compared to the theory, as well as the results of previous research in this area. However, it is important to note that such an analytical generalisation (Yin, 1994), in which a previously developed theory can be used as a template, was also constrained by the infancy of the field itself. Although the results from earlier studies can be applied, a proven theory that explicitly examines social presence development and its effects on online learning has not been established, thus making it difficult to generalise the findings. Such being the case, an attempt to relate the current findings to some broader theories in related fields was made.

9.3.2 Tool

This research modified a social presence template developed from previous studies (Rourke et al., 2001a; Swan, 2002) for the analysis of social presence in the online education domain. The template (see Section 6.5.2) was intended to provide an effective means to measure social presence and communication among online participants from computer conferencing and other text-based communications. The original template (see Section 6.5.1) offered a strong potential to critically assess social components in online learning, but certain aspects, such as the suitability of social presence indicators, limited its application. In the previous studies, the tool was only applied to a small data set within a limited period of time. This certainly requires other research studies to further develop and enhance the replicability of the tool (Rourke et al., 2001a).

Two major criteria for assessing the improvement of the modified template mentioned earlier (see Section 1.9.2) are the ability of the template to capture various aspects of social presence in online discussions and its replicability when it is applied to different contexts with a larger amount of data. Based on these criteria, some indicators unsuitable for measuring online social presence were excluded. For instance, such indicators as

continuing thread, *quoting messages*, and *referring to other messages* in the original template (Rourke et al., 2001a) could not represent the level of interactivity among participants in computer conferencing. Thus, they were omitted from the modified template in order to enhance its capability to capture genuine aspects of social presence and social communication in online contexts. Some other indicators (e.g., help/assistance, personal values) were also added or modified in order to enhance the ability to cover various aspects of online social presence. Moreover, the modified template was employed to analyse a large number of conferencing messages from two different cohorts. Similar findings between the two cohorts were found, thus increasing its replicability.

9.3.3 Methods

The research used content analysis as the key method for addressing the first research question (see Chapter 7). Using a longitudinal study design, the conferencing messages among participants throughout the online courses were gathered and analysed using this technique to gain a better knowledge of online social presence. Content analysis can be just simple word counts but what makes it much more meaningful and useful is the interpretation of the text or messages. In that case, however, subjectivity of the coding procedure can become a limitation of this method, as the coding usually involves an analysis of latent or ambiguous content. Although some degree of subjectivity (e.g., coder bias) is unavoidable in such types of content analysis, it must be kept to a minimum (Rourke et al., 2001b).

To lessen the effects of subjectivity and increase reliability and validity, various procedures were performed. For instance, the conferencing messages in each module were coded and reviewed several times by the researcher to enhance the stability of the coding process and results. Replicability, the extent to which the analysis achieves the same results under different situations, was also obtained from the test using the percentage of agreement between two coders. In this research, several attempts were also made to achieve validity of the research process. Applying a theoretically predefined measure, such as the modified social presence template, helped increase both content and construct validity. The coding guidelines (see Appendix G) developed to provide explicit coding criteria and helpful instructions for the coding process also enhanced semantic validity. For statistical methods, which were used to address the research question in

Chapter 8, the basic assumptions for t-test and regression analysis were also tested to ensure reliability and validity of the results as much as possible.

9.4 Strengths and limitations

9.4.1 Strengths

There are four major strengths of this research. Perhaps one of the greatest strengths of the research is that it was conducted using a longitudinal approach. Previously, social presence studies have been conducted within a short-term period, which provides just a snapshot of a long and complex process of social presence development and may not be able to represent the whole story. In contrast, the conferencing messages collected from two different cohorts[29] allowed the researcher to understand the development patterns of online social presence. Because social presence varied over time and took longer in online contexts, a different conclusion could be made if social presence was explored in a particular period or in a shorter-term study.

The next strength of this research lay in the selected methodology and methods. Case study as the research methodology had several advantages over the others. Unlike an experimental study, there being no control over the participants and the contexts in case study research allowed data to be gathered from a context that reflected an actual OLC. Unlike such methods as interview or other participative research, in which the researchers have to come into contact directly with the participants, content analysis is less obtrusive, and thus allows the data to be observed without causing changes (Weber, 1990).

Another strength of this research was the combination of both quantitative findings and qualitative data in order to provide a more comprehensive view of social presence. Quantitative findings presented the whole view of social presence development and allowed it to be examined in relation to other factors in OLCs. On the other hand, qualitative data derived from the review of the online discussions provided an immediate understanding of social presence and illustrated social interaction among online participants. Finally, yet importantly, this research laid the ground for a wide range of

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[29] Each cohort ran for an entire year (48 weeks).

applications. It provided a useful methodological framework and tool that can be further developed and applied to other research in this area. Such methods as content analysis can be performed together with other research techniques to gain a better understanding of social presence and the social dimension of online interaction.

9.4.2 Limitations

This study was also subject to several limitations. The first limitation related to the generalisability of findings from a single case study. Although much effort had been made to obtain more cases, issues concerning data protection prevented the researcher from gaining access to a number of programmes. Therefore, data collected from only one case study could potentially limit its generalisability.

The second limitation related to the sample size of the study. Although the number of observations (N=128) derived from students from two cohorts was adequate for such statistical techniques as t-test and regression analysis, a larger sample would probably have generated more accurate findings. However, this was a common limitation found in the study of online learning environments. Although this mode of education has a potential to provide learning opportunities to a large number of people, most online programmes control the number of students in one class in order to provide sufficient support and encourage students' involvement.

Another limitation of the research probably lay in the scope of data collection. In this research, content analysis was unable to capture the entirety of the social event among online participants because the messages from computer conferencing were the only source of data available to the researcher. Social interaction among the participants that took place outside the conference (e.g., personal e-mail, telephone, face-to-face) was beyond the scope of this research and not included in the analysis. Although the study yielded a number of significant insights, it has been able to provide just a part of the whole picture of social presence usage and its development in OLCs (see Anderson et al., 2001).

Another limitation was derived from the limited factors involved in the regression analysis. In online learning, such factors as academic background, work experience, age, marital status, and so on, could have a significant impact on students' active participation

and their learning outcomes. However, these factors could not be incorporated into the regression analysis because the researcher had no control over the case study, making it difficult to obtain these data. Some research studies where the researchers have authority over the programme may be able to have more control over the research design and the data collection process.

While content analysis was a useful technique to investigate social presence in the current research, a limitation existed in terms of its ability to capture and signify the richness of longitudinal data. Shoemaker and Reese (1996) also argue that reducing a large amount of text to quantitative data might not provide an entire view of meanings because textual materials are often complex and multifaceted. Although the review of conferencing messages was performed to support the findings of content analysis, a more rigorous qualitative approach would have provided a greater knowledge of social presence development in an online context. Finally, this research involved the analysis of latent content, or underlying meaning of the content in the conferencing messages, which added a measure of subjectivity to the research. The content analysis process involving latent content provides a meaningful interpretation but it is also inherently subjective (Rourke et al., 2001b). To reduce the impact of subjectivity and enhance reliability of the coding process, intercoder reliability using agreement between two coders was carried out (see Section 7.2.2.1).

9.5 Conclusions

This section presents the overall conclusions drawn from the research findings described earlier (see Section 9.1). Three major issues raised are the importance of social presence in OLCs, the role of online tutors to support online social presence and learning, and the impact of face-to-face interaction on learning in such contexts.

9.5.1 The importance of social presence in OLCs

This research cannot emphasise enough that social presence is important and must be supported in OLCs. If learning is a matter of social engagement among individuals, social presence should be considered one of the most significant factors that enhance an effective online learning process. Put more simply, social interaction among online participants needs social presence to make learning in such contexts more constructive and meaningful.

From the preliminary study, it was possible to assume that social presence supports the creation of such factors as identity, trust, and personal relationships in text-based OLCs where contextual cues are missing. Social presence through the expression of personal values fosters identity construction while self-disclosure helps create swift trust that can later develop into a higher form of trust among online participants. Such indicators as group references also create intimacy and personal relationships, which increase the efficiency of knowledge sharing among the participants. In the main study, content analysis (Chapter 7) and the review of online discussions confirmed the notion that social presence helps create constructive social interaction in online environments. Regression analysis (Chapter 8) also made it clear that social presence has positive impacts on both active participation and the cognitive learning outcomes of online students. These findings allowed both researchers and practitioners to understand and reflect on how to improve the online teaching and learning process and its design.

Another interesting issue relates to how online social presence can be supported. Various tools and techniques can actually be used to establish such a feeling, as well as affective communication, in online contexts. This research mentioned these in part but they were beyond the scope of the research and should be further discussed elsewhere in much greater detail. However, an important point raised is that, no matter how useful such tools and techniques are, establishing and maintaining social presence online is a collective process, in which every participant must contribute in order to succeed. Having said that, this research suggests that online tutors play an active part in this process, as they are in a good position to create and facilitate these activities. The next section further describes the significance of online tutors and their roles in detail.

9.5.2 The roles of online tutors in OLCs

The roles of online tutors and their active presence are crucial to the students' learning process and the formation of collaborative OLCs. In such contexts, they can play an important part in enhancing both social communication and cognitive development. They can also serve as a good example for online students in interacting and exchanging knowledge through dynamic class discussions and constructive criticism (Harasim et al., 2001). Palloff and Pratt (2003) emphasise, "when the instructor is present—posting regularly to the discussion board, responding in a timely manner to e-mail and assignments, and generally modelling good online communication and interaction—

students will do the same, and a high degree of interactivity will occur" (p. 118). Many research studies (e.g., Tagg & Dickinson, 1995) also show that students contribute more in a class where tutors promote students' input than in a class where tutors do not.

Findings from content analysis shed some light on how online tutors performed their roles to support learning activities in OLCs. Clearly, such a facilitative role as providing help and assistance was the most prominent role of the online tutors in the collaborative online learning. These findings highlighted the increased importance of online tutors as facilitators who assist students in the learning process and help them construct knowledge rather than just produce a series of facts (Harasim et al., 2001). Scaffolding (Wood et al., 1976; Wood & Middleton, 1975) can be used to provide a temporary support for students to perform an emerging task in OLCs. Scaffolding through helpful guidance helps facilitate active knowledge construction because students are motivated to think and solve the problem. Suggesting useful resources for learning also supports this process, as students are able to explore a wide range of learning materials by themselves and gain different perspectives for both critical thinking and further discussions.

Although the findings suggested that the roles of online tutors as active facilitators in the learning process were dominant, their roles as content experts were also found throughout the programme. In particular, online tutors constantly provided learning content and scaffolded students' understanding through explanatory feedback. They also performed an active role in identifying misconceptions in students' understanding and providing them with a summary of discussions at the end of each study unit. While many educators (e.g., Hiltz, 1998; Rowntree, 1995) have paid increasing attention to the facilitative efforts of tutors in online learning, a level of tutor intervention is essential, and too little input from the tutors can be problematic for both the learning process and outcomes (Jones & Issroff, 2005; Moore & Kearsley, 1996). Having said that, the role of tutors in online contexts is dependent on various important factors, including the type of students, the nature of the discipline, the content of the programme, and online teaching skills (see Jones & Issroff, 2005; Jones et al., 2000). It is suggested that online tutors perform these roles (facilitator vs. instructor) by shifting back and forth. The degrees to which each role is applied should be varied depending on a number of factors that must be taken into account.

9.5.3 *The impact of face-to-face interaction in OLCs*

Throughout history, face-to-face interaction has been fundamental to the learning process. It is perhaps impossible to think of learning without it. The literature shows that this element is also important for social interaction and knowledge acquisition in online environments. The findings from the preliminary study supported this notion. Face-to-face interaction provided support for online collaboration and the creation of such social factors as trust and personal relationships. Potential constraints did not seem to have adverse effects on online social interaction and learning, possibly because of prior face-to-face contact. The results that social presence had constructive impacts on both learning process and outcomes (see Chapters 7 and 8) could also possibly be because participants met face-to-face before, and for some participants, after the programme started, which helped create and sustain their sense of presence throughout the programme. The expression of social presence among participants in the programme could also be regarded as a strategy to compensate for the missing cues and an attempt to make social communication in online environments comparable to that face-to-face (Danchak et al., 2001).

Although some research studies claim that the advance in online learning allows students to complete the course or programme without meeting face-to-face, this element is considered important for many people (Palloff & Pratt, 1999). While a face-to-face session is not compulsory for many online courses, why do a number of people, both local and international, still bother to attend and believe that such an activity is so worthwhile? This might lead to the question, related to this research, of whether collaborative OLCs, in which learning takes place via asynchronous text-based communication, be created without any face-to-face element? Although ACMC has been shown to provide support for online social interaction and knowledge sharing, much literature suggests that it is less suitable for sensitive and complex situations, such as conflict negotiation. The literature in the areas of knowledge management (KM) also indicates that the sharing of tacit knowledge is much more difficult without face-to-face interaction (Nonaka & Takeuchi, 1995). Face-to-face interaction creates opportunities for people to develop rapport and the social factors necessary for social engagement in OLCs. Rocco (1998) also suggests that such a social event is a prerequisite for trust development in electronic communication. However, there is no one-size-fits-all solution. A face-to-face meeting should be kept in mind when designing or developing

an online course. Tutors and practitioners in this area should consider this matter in terms of the possibility and suitability of integrating a face-to-face element with the goal of maximising the benefits to online learners.

9.6 Future work

A primary intention for future social presence study is an application of the methodological framework and tool to measure social presence in other case studies and compare the results. This can help validate the current findings, enhance generalisability, increase the usability of the tool, and add a further contribution to the research field. Some important variables of the learning process and outcomes (e.g., education and work experience) should be included in the regression analysis to create a more robust regression model and increase its explanatory power. The study should also be applied to a larger sample size, which can improve the generalisability and validity of the findings.

Future research can be designed to associate social presence with other variables to see how it relates to other factors. Apart from active involvement and learning outcomes investigated in the current research, future studies can be performed in which social presence is used as an independent variable of such factors as perceived learning, satisfaction, attitude, and dropout rate of online students. It can also be utilised as a dependent variable of such factors as tutor role, guest speaker, and course design. Statistical data from content analysis can be used along with other methods (e.g., survey and interview) to gain an in-depth knowledge of social presence and these factors. Besides, a more rigorous qualitative approach, which can be used to analyse conferencing messages in greater detail, should be considered in the future research in order to capture the rich data of online discussions and to provide an understanding of social presence development in a more fine-grained way. If needed, an experimental setting that allows more control over the research process may also be performed.

Other possible future research may focus on particular social presence indicators that are significant predictors of a constructive learning process and outcomes in this research (e.g., personal values, self-disclosure, agreement/disagreement, invitation). This allows the researcher to validate the current findings and investigate these indicators in more depth. In addition, it might be interesting to conduct a further study in an entirely online setting to determine whether learning without face-to-face interaction has an impact on

social presence and learning in OLCs. Some questions related to this matter include: does online learning without any face-to-face contact make it more difficult for participants in OLCs to create and maintain their social presence? Does the social presence development change if participants never meet each other before the course begins? In a completely online situation, some other factors such as space, time, culture, and language may also have a greater negative impact on how online participants learn and create their presence.

Research studies show that the role of online tutors is highly related to students' learning in online contexts. Future research can involve an extension of the methodological framework used in this research to assess tutor roles in OLCs. The content analysis technique may allow the researcher to explore this in detail. The coding template developed by Anderson et al., (2001) can be modified and used as a tool to analyse such roles as administrator, facilitator, and instructor from online conferencing messages.

The current research was conducted in the context of the postgraduate level, particularly at the continuing professional development level. It could be possible that study in different settings (e.g., at undergraduate level in which students are much less mature and may be less motivated) yields a different result. Therefore, in the future, it would be useful to carry out a study in these contexts in order to see how social presence development and its patterns are different from those of the current study. Furthermore, although this research is primarily designed for the study of social presence and social communication in online education, it would also be interesting to apply the methodological framework and tool to non-educational settings, such as online CoP or virtual teams in organisations.

9.7 Concluding remark

This research is derived from the need to investigate social presence in online learning environments. This concept has attracted a great deal of attention in recent years for its positive impact on online learning processes and outcomes. In fact, it can be considered a meta-theory that explains constructive online social interaction and its underlying factors in such contexts.

CHAPTER 9 SUMMARY AND CONCLUSIONS

This research provided the results from a longitudinal study and presented a practical methodological framework to examine online social presence. A combination of content analysis and various statistical techniques offered a unique and useful method for the investigation. The research not only filled the existing gaps but also contributed to an increased understanding of this social element in online settings. It also brought up key methodological issues with an aim to provide a helpful guidance for conducting further study in this area.

The research was in part exploratory, given the lack of previous studies on online social presence applying a longitudinal approach. However, it was hoped to provide useful implications and lay the ground for online learning researchers and practitioners in the development of effective teaching and learning strategies, as well as a collaborative OLC. Some of the findings in this research suggested that there is substantial room for future work. Further studies are also needed to validate the results in a more general way.

Abbreviations

ACMC	Asynchronous Text-Based Computer-Mediated Communication
CMC	Computer-Mediated Communication
CoP	Communities of Practice
CR	Coefficient of Reliability
EU	European Union
HU	Hermeneutic Unit
IVETTE	Implementation of Virtual Environments in Training and Education
KM	Knowledge Management
LPP	Legitimate Peripheral Participation
OLCs	Online Learning Communities
SPPQ	Social Presence and Privacy Questionnaire
VE	Virtual Environment
VIF	Variance-Inflation Factor
VLEs	Virtual Learning Environments
VR	Virtual Reality
ZPD	Zone of Proximal Development
UK	United Kingdom

APPENDIX A

Pre-module questionnaire

THE UNIVERSITY of York

Part I

A Survey on

Collaborative Online Learning Communities in

Health Economics for Health Care Professionals

This questionnaire forms parts of my PhD research regarding collaborative online learning communities in distance education. I would be very grateful if you can spend about 10 minutes, or so, to fill in this questionnaire.

The main purpose of this questionnaire is to investigate and understand the potential constraints people might be expected to experience in online distance education. In addition, it is intended to discover some social factors that can affect effective online interaction and collaboration. Further, it also aims to gain insights into whether the concepts of communities, or learning communities, are essential for learning processes in an online context.

The questionnaire is divided into six sections as follows:

Section A: General Information This section aims to get the contact details and some general information.
Section B: Background Information This section aims to obtain background information, especially the previous experiences in online communities and other basic qualifications.
Section C: Social Interaction in Online Learning Communities This section aims to gain some insights about the perception of students towards social interaction in online learning communities.
Section D: Social Factors in Online Learning Communities This section aims to gain some understandings about the awareness of the social factors that can have an influence on social interaction in online learning communities.
Section E: Constraints in Online Learning Communities This section aims to identify potential constraints, especially space, time, culture, and language in online learning communities.
Section F: Face-to-Face Interaction in Online Learning Communities This section aims to evaluate how significant the face-to-face contact is for learning processes in online education.

The questions labelled with an asterisk (*) are mandatory because they affect data analysis of the survey. Apart from that, if you feel any of the following questions invade your privacy, you are of course free to decline to answer them. The information that you provide will remain STRICTLY CONFIDENTIAL, and will only be used for the purposes of this study. The results of the survey will be in the form of aggregated data and no answers will be associated with individual respondents.

As a part of the study, at the later date, I may need your help to fill in the follow-up survey in order to see how your views change. Thank you.

Section A: General Information

This section aims to get the contact details and some general information about you.

1. Contact Details*

Please fill in this section if you don't mind being approached with follow-up questions regarding this survey at the later date.

Title: _____

First Name: _____

Surname: _____

Email: _____

2. Personal Background*

Gender: ❑ *Male* 6 (37.5%) ❑ *Female* 10 (62.5%)

Age: *Mean = 34.81* Range = 26-50

Nationality: *5 British (31.3%), 1 Danish (6.3%), 3 Dutch (18.8%), 1 French (6.3%), 2 Irish (12.5%), 1 Portuguese (6.3%), 1 South African (6.3%), 1 Swiss (6.3%), and 1 Tanzanian (6.3%)*

Ethnic Background:	❑ *African*	❑ *Asian*	❑ *Caucasian*	❑ *Hispanic*	❑ *Other* _____
	1	-	15	-	-
	(6.3%)	-	(93.8%)	-	-

Marital Status:	❑ *Single*	❑ *Married*	❑ *Separated*	❑ *Divorced*	❑ *Other* _____
	7	9	-	-	-
	(43.8%)	(56.3%)	-	-	-

3. Professional Background*

You are:	❑ *Full-time worker*	❑ *Part-time worker*	❑ *Unemployed*	❑ *Student*	❑ *Other* _____
	15	1	-	-	-
	(93.8%)	(6.3%)	-	-	-

Section B: Background Information

This section aims to obtain background information, especially your previous experiences in online communities and other basic qualifications, such as language and computing skills.

1. Have you previously taken any online or distance education programme?*

❑ *Yes*	❑ *No*
3	13
(18.8%)	(81.3%)

2. Is English your first language?*

❑ *Yes*	❑ *No*
8	8
(50%)	(50%)

(If YES, go to question 3)

How confident do you feel about using English as a communication medium?

Please select one of the rating values that most closely matches your feelings in the use of English language:

	Very confident	**Confident**	**Little confidence**	**No confidence**
Reading	7	1	-	-
	(87.5%)	(12.5%)	-	-
Writing	5	3	-	-
	(62.5%)	(37.5%)	-	-
Speaking	4	4	-	-
	(50%)	(50%)	-	-
Listening	5	3	-	-
	(62.5%)	(37.5%)	-	-

3. Experience with computers and computer applications:

Please read the following statements and select one of the rating scales that most closely matches your experience with computers and computer applications:

	Never	**Rarely**	**Sometimes**	**Often**
I use personal computers**	-	-	-	15
	-	-	-	(93.8%)
I use word processors**	-	1	1	13
	-	(6.3%)	(6.3%)	(81.3%)
I use web browsers	-	-	3	13
	-	-	(18.8%)	(81.3%)
I use emails	-	-	-	16
	-	-	-	(100%)
I use bulletin boards	5	7	3	1
	(31.5%)	(43.8%)	(18.8%)	(6.3%)

** Missing value = 1

4. Where do you normally use a personal computer?

❑ *Home*	❑ *Workplace*	❑ *Both*	❑ *Other* _____
-	3	13	-
-	(81.3%)	(18.8%)	-

5. Where do you normally get access to the Internet?

❑ *Home*	❑ *Workplace*	❑ *Both*	❑ *Other* _____
-	3	13	-
-	(81.3%)	(18.8%)	-

Section C: Social Interaction in Online Learning Communities

This section aims to gain some insights about the perception of students towards social interaction in online learning communities.

Online social interaction

At this stage of the programme, please tell me whether you agree, neither agree nor disagree (neutral), or disagree with the following statements:

	Agree	**Neutral**	**Disagree**
Interaction with other class members will reduce social isolation	11 (68.8%)	4 (25%)	1 (6.3%)
Interaction with other class members will make me feel more enthusiastic	13 (81.3%)	3 (18.8%)	- -
Interaction with other class members will help me gain new knowledge	15 (93.8%)	1 (6.3%)	- -
Participation in class discussion will help me develop a personal relationship with other members	10 (62.5%)	5 (31.5%)	1 (6.3%)
Participation in class discussion will help me create my sense of belonging to the class	13 (81.3%)	1 (6.3%)	2 (12.5%)
Interaction with other class members will offer me a positive learning experience	14 (87.5%)	2 (12.5%)	- -

Other comments ----------

Section D: Social Factors in Online Learning Communities

This section intends to gain some understandings about your awareness of the social factors that can have an influence on social interaction in online learning communities.

1. Identity

Please read the following questions and choose a response, which most closely matches your views:

Is knowing others' identity important for interaction in an online class?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
8	7	1
(50%)	(43.8%)	(6.3%)

Does geographical distance in an online education make identity more difficult to establish?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
10	5	1
(62.5%)	(31.3%)	(6.3%)

Do you think that identity take time to establish in an online education?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
8	3	5
(50%)	(18.8%)	(31.3%)

Other comments ----------

2. Trust

Please read the following questions and choose a response, which most closely matches your views:

Is trust important for interaction in an online class?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
7 (43.8%)	3 (18.8%)	6 (37.5%)

Do you think that trust can be established in an online class?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
13 (81.3%)	- -	3 (18.8%)

Does geographical distance in an online education make trust more difficult to establish?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
2 (12.5%)	9 (56.3%)	5 (31.3%)

Do you think that trust take time to establish in an online education?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
7 (43.8%)	4 (25%)	5 (31.3%)

Other comments ----------

3. Personal Relationships

Please read the following questions and choose a response, which most closely matches your views:

Is a personal relationship important for interaction in an online class?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
9 (56.3%)	2 (12.5%)	5 (31.3%)

Do you think that a personal relationship can be established in an online class?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
12 (75%)	1 (6.3%)	3 (18.8%)

Does geographical distance in an online education make a personal relationship more difficult to establish?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
3 (18.8%)	9 (56.3%)	4 (25%)

Do you think that a personal relationship take time to establish in an online education?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
11 (68.8%)	3 (18.8%)	2 (12.5%)

Other comments ----------

Section E: Constraints in Online Learning Communities

This section aims to identify potential constraints, especially space, time, culture and language, in online learning communities.

1. Space constraints

Based on your personal view, please tell me whether you agree, neither agree nor disagree (neutral), or disagree with the following statements:

	Agree	**Neutral**	**Disagree**
Learning over distance will be lonely	7 (43.8%)	5 (31.3%)	4 (25%)
Learning over distance will result in fewer interactions with other class members	10 (62.5%)	3 (18.8%)	3 (18.8%)
Learning over distance will be less motivating than learning in the classrooms	2 (12.5%)	5 (31.3%)	9 (56.3%)

Other comments ----------

2. Time constraints

Based on your personal view, please tell me whether you agree, neither agree nor disagree (neutral), or disagree with the following statements:

	Agree	Neutral	Disagree
Different time zones will make it more difficult for real-time collaboration	11 (68.8%)	4 (25%)	1 (6.3%)
Different time zones will make it less motivating for real-time collaboration	4 (25%)	6 (37.5%)	6 (37.5%)

Other comments ----------

3. Cultural differences

Based on your personal view, please tell me whether you agree, neither agree nor disagree (neutral), or disagree with the following statements:

	Agree	Neutral	Disagree
Cultural differences will make it more difficult for people in an online class to understand each other	1 (6.3%)	5 (31.3%)	10 (62.5%)
Cultural differences will make it more difficult to collaborate online	1 (6.3%)	4 (25%)	11 (68.8%)
Cultural differences will make it more difficult to establish trust in an online class	- -	2 (12.5%)	14 (87.5%)
Cultural differences will make it more difficult to establish personal relationships in an online class	1 (6.3%)	1 (6.3%)	14 (87.5%)

Other comments ----------

4. Language differences

Based on your personal view, please tell me whether you agree, neither agree nor disagree (neutral), or disagree with the following statements:

	Agree	Neutral	Disagree
Language differences will make it more difficult for people in an online class to understand each other	3 (18.8%)	5 (31.3%)	8 (50%)
Language differences will make it more difficult for class members to collaborate online	2 (12.5%)	6 (37.5%)	8 (50%)
Language differences will make the sharing of knowledge in an online class less effective	1 (6.3%)	6 (37.5%)	9 (56.3%)

Other comments ----------

Section F: Face-to-Face Interaction in Online Learning Communities

This section aims to evaluate how significant the socialisation and interaction among the students during the residential workshop was for learning processes in online education.

The Workshop

At this stage of the programme, please tell me whether you agree, neither agree nor disagree (neutral), or disagree with the following statements:

	Agree	Neutral	Disagree
Face-to-face contact with other people at the workshop is important for online collaboration	16 (100%)	- -	- -
The groupwork sessions help me form personal relationships with other people	8 (50%)	6 (37.5%)	2 (12.5%)
The groupwork sessions help me establish trust with other people	11 (68.8%)	4 (25%)	1 (6.3%)
The workshop makes me confident in contributing to the future online discussions	10 (62.5%)	5 (31.3%)	1 (6.3%)

Other comments .....

Finally, please feel free to add whatever comments or questions

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Thank you for your time completing this questionnaire. Any information disclosed will remain STRICTLY CONFIDENTIAL. The results of the survey will be in the form of aggregated data and no answers will be associated with individual respondents. A report summarising the results of this survey will be available to all respondents. If you would like a copy, please tick [✓] here ❑

For more information about the research, please visit the website at http://www-users.cs.york.ac.uk/~adisornn/. If you have further queries, please contact the author at the address below:

Adisorn Na Ubon
Department of Computer Science
University of York
York YO10 5DD, UK
Tel: +44 1904 433243 Fax: +44 1904 432767
Email: adisornn@cs.york.ac.uk

APPENDIX B

Codebook for pre-module questionnaire

APPENDIX B

Item	Mnemonic	Type	Measure	Possible Values	Missing Values
Section A: General Information					
A01_1	TITLE	String	Nominal	Text	9
A02_1	FIRSTNAM	String	Nominal	Text	9
A03_1	LASTNAM	String	Nominal	Text	9
A04_1	EMAIL	String	Nominal	Text	9
A05_1	GENDER	Numeric	Nominal	1=Male 2=Female	9
A06_1	AGE	Numeric	Scale	Number of years	99
A07_1	NATIONAL	String	Nominal	Text	9
A08_1	ETHNIC	Numeric	Nominal	1=African 2=Asian 3=Caucasian 4=Hispanic 7=Other	9
A09_1	OETHNIC	String	Nominal	Text	-
A10_1	MSTATUS	Numeric	Nominal	1=Single 2=Married 3=Separated 4=Divorced 7=Other	9
A11_1	OMSTATUS	String	Nominal	Text	-
A12_1	PROFESSN	Numeric	Nominal	1=Full-time worker 2=Part-time worker 3=Unemployed 4=Student 7=Other	9
A13_1	OPROFES	String	Nominal	Text	-
Section B: Background Information					
B01_1	PREVTAKE	Numeric	Nominal	1=Yes 2=No	9
B02_1	ENATIVE	Numeric	Nominal	1=Yes 2=No	9
B03_1	EREADING	Numeric	Nominal	0=No confidence 1=Little confidence 2=Confident 3=Very confident	9
B04_1	EWRITING	Numeric	Nominal	0=No confidence 1=Little confidence 2=Confident 3=Very confident	9
B05_1	ESPEAKNG	Numeric	Nominal	0=No confidence 1=Little confidence 2=Confident 3=Very confident	9
B06_1	ELSTNING	Numeric	Nominal	0=No confidence 1=Little confidence 2=Confident 3=Very confident	9
B07_1	COMPUTER	Numeric	Ordinal	0=Never 1=Rarely 2=Sometimes 3=Often	9
B08_1	WORDPROS	Numeric	Ordinal	0=Never 1=Rarely 2=Sometimes 3=Often	9

B09_1	BROWSER	Numeric	Ordinal	0=Never 1=Rarely 2=Sometimes 3=Often	9
B10_1	EMAIL	Numeric	Ordinal	0=Never 1=Rarely 2=Sometimes 3=Often	9
B11_1	BULLETIN	Numeric	Ordinal	0=Never 1=Rarely 2=Sometimes 3=Often	9
B12_1	COMUSE	Numeric	Nominal	1=Home 2=Workplace 3=Both 7=Other	9
B13_1	OCOMUSE	String	Nominal	Text	-
B14_1	NACCESS	Numeric	Nominal	1=Home 2=Workplace 3=Both 7=Other	9
B15_1	ONACCESS	String	Nominal	Text	-
Section C: Social Interaction in Online Learning Communities					
C01_1	ISOLATE	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
C02_1	ENTHUST	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
C03_1	KNWLEDG	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
C04_1	RELATIO	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
C05_1	BLONGIN	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
C06_1	EXPRNCE	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
C07_1	COMMEN01	String	Nominal	Text	-
Section D: Social Factors in Online Learning Communities					
DO1_1	IIMPORT	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
DO2_1	IDFCLT	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
DO3_1	ITKTIME	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
DO4_1	COMMEN06	String	Nominal	Text	-
DO5_1	TIMPORT	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9

DO6_1	TESTBLSH	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
DO7_1	TDFCLT	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
DO8_1	TTKTIME	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
DO9_1	COMMEN07	String	Nominal	Text	-
D10_1	PIMPORT	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
D11_1	PESTBLSH	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
D12_1	PDFCLT	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
D13_1	PTKTIME	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
D14_1	COMMEN08	String	Nominal	Text	-
Section E: Constraints in Online Learning Communities					
E01_1	SLONELY	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
E02_1	SFEWINTR	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
E03_1	SMOTIVE	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
E04_1	COMMEN02	String	Nominal	Text	-
E05_1	TCOLLAB	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
E06_1	TMOTIVE	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
E07_1	COMMEN03	String	Nominal	Text	-
E08_1	CUNDERST	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
E09_1	CCOLLAB	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
E10_1	CTRUST	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
E11_1	CPERSONL	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
E12_1	COMMEN04	String	Nominal	Text	-

E13_1	LUNDERST	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
E14_1	LCOLLAB	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
E15_1	LKNWLEDG	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
E16_1	COMMEN05	String	Nominal	Text	-
Section F: Face-to-Face Interaction in Online Learning Communities					
F01_1	WIMPORT	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
F02_1	WRLATION	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
F03_1	WTRUST	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
F04_1	WFUTURE	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
F05_1	COMMEN09	String	Nominal	Text	-
F06_1	COMMEN10	String	Nominal	Text	-

Table 32 Codebook for pre-module questionnaire

APPENDIX C

Results of experienced vs. non-experienced students

		Experience in online programme				Total	
		No		Yes			
Interaction with other class members will reduce social isolation	Disagree	1	7.7%	-	-	1	6.3%
	Neutral	3	23.1%	1	33.3%	4	25.0%
	Agree	9	69.2%	2	66.7%	11	68.8%
Interaction with class members will make me feel more enthusiastic	Neutral	3	23.1%	-	-	3	18.8%
	Agree	10	76.9%	3	100.0%	13	81.3%
Interaction with class members will help gain new knowledge	Neutral	1	7.7%	-	-	1	6.3%
	Agree	12	92.3%	3	100.0%	15	93.8%
Participation in class discussion will help me develop a personal relationship	Disagree	1	7.7%	-	-	1	6.3%
	Neutral	4	30.8%	1	33.3%	5	31.3%
	Agree	8	61.5%	2	66.7%	10	62.5%
Participation in class discussion will help create a sense of belonging	Disagree	2	15.4%	-	-	2	12.5%
	Neutral	1	7.7%	-	-	1	6.3%
	Agree	10	76.9%	3	100.0%	13	81.3%
Interaction with class members will offer a positive learning experience	Neutral	2	15.4%	-	-	2	12.5%
	Agree	11	84.6%	3	100.0%	14	87.5%

Table 33 Social interaction in OLCs

		Experience in online programme				Total	
		No		Yes			
1. Identity							
Knowing others' identity is important for interaction in an online class	No	6	46.2%	1	33.3%	7	43.8%
	Not sure	1	7.7%	-	-	1	6.3%
	Yes	6	46.2%	2	66.7%	8	50.0%
Geographical distance makes identity more difficult to establish	No	2	15.4%	3	100.0%	5	31.3%
	Not sure	1	7.7%	-	-	1	6.3%
	Yes	10	76.9%	-	-	10	62.5%
Identity takes time to establish in an online education	No	3	23.1%	-	-	3	18.8%
	Not sure	5	38.5%	-	-	5	31.3%
	Yes	5	38.5%	3	100.0%	8	50.0%
2. Trust							
Trust is important for interaction in an online class	No	3	23.1%	-	-	3	18.8%
	Not sure	6	46.2%	-	-	6	37.5%
	Yes	4	30.8%	3	100.0%	7	43.8%
Trust can be established in an online class	Not sure	3	23.1%	-	-	3	18.8%
	Yes	10	76.9%	3	100.0%	13	81.3%
Geographical distance makes trust more difficult to establish	No	6	46.2%	3	100.0%	9	56.3%
	Not sure	5	38.5%	-	-	5	31.3%
	Yes	2	15.4%	-	-	2	12.5%
Trust takes time to establish in an online education	No	4	30.8%	-	-	4	25.0%
	Not sure	4	30.8%	1	33.3%	5	31.3%
	Yes	5	38.5%	2	66.7%	7	43.8%
3. Personal relationships							
Personal relationship is important for interaction in an online class	No	2	15.4%	-	-	2	12.5%
	Not sure	5	38.5%	-	-	5	31.3%
	Yes	6	46.2%	3	100.0%	9	56.3%
Personal relationship can be established in an online class	No	1	7.7%	-	-	1	6.3%
	Not sure	3	23.1%	-	-	3	18.8%
	Yes	9	69.2%	3	100.0%	12	75.0%
Geographical distance makes a personal relationship more difficult to establish	No	6	46.2%	3	100.0%	9	56.3%
	Not sure	4	30.8%	-	-	4	25.0%
	Yes	3	23.1%	-	-	3	18.8%
Personal relationship takes time to establish in an online education	No	3	23.1%	-	-	3	18.8%
	Not sure	2	15.4%	-	-	2	12.5%
	Yes	8	61.5%	3	100.0%	11	68.8%

Table 34 Social factors in OLCs

		Experience in online programme				Total	
		No		Yes			
Constraints in OLCs							
1. Space constraints							
Learning over distance will be lonely	Disagree	1	7.7%	3	100.0%	4	25.0%
	Neutral	5	38.5%	-	-	5	31.3%
	Agree	7	53.8%	-	-	7	43.8%
Learning over distance will result in fewer interactions	Disagree	2	15.4%	1	33.3%	3	18.8%
	Neutral	2	15.4%	1	33.3%	3	18.8%
	Agree	9	69.2%	1	33.3%	10	62.5%
Learning over distance will be less motivating	Disagree	6	46.2%	3	100.0%	9	56.3%
	Neutral	5	38.5%	-	-	5	31.3%
	Agree	2	15.4%	-	-	2	12.5%
2. Time constraints							
Different time zones will make it more difficult for real-time collaboration	Disagree	1	7.7%	-	-	1	6.3%
	Neutral	1	7.7%	3	100.0%	4	25.0%
	Agree	11	84.6%	-	-	11	68.8%
Different time zones will make it less motivating for real-time collaboration	Disagree	6	46.2%	-	-	6	37.5%
	Neutral	3	23.1%	3	100.0%	6	37.5%
	Agree	4	30.8%	-	-	4	25.0%
3. Cultural differences							
Cultural differences will make it more difficult for people in an online class to understand each other	Disagree	9	69.2%	1	33.3%	10	62.5%
	Neutral	3	23.1%	2	66.7%	5	31.3%
	Agree	1	7.7%	-	-	1	6.3%
Cultural differences will make it more difficult to collaborate online	Disagree	10	76.9%	1	33.3%	11	68.8%
	Neutral	2	15.4%	2	66.7%	4	25.0%
	Agree	1	7.7%	-	-	1	6.3%
Cultural differences will make it more difficult to establish trust in an online class	Disagree	11	84.6%	3	100.0%	14	87.5%
	Neutral	2	15.4%	-	-	2	12.5%
Cultural differences will make it more difficult to establish personal relationship in an online class	Disagree	11	84.6%	3	100.0%	14	87.5%
	Neutral	1	7.7%	-	-	1	6.3%
	Agree	1	7.7%	-	-	1	6.3%
4. Language differences							
Language differences will make it more difficult for people in an online class to understand each other	Disagree	6	46.2%	2	66.7%	8	50.0%
	Neutral	4	30.8%	1	33.3%	5	31.3%
	Agree	3	23.1%	-	-	3	18.8%
Language differences will make it more difficult for class members to collaborate online	Disagree	6	46.2%	2	66.7%	8	50.0%
	Neutral	5	38.5%	1	33.3%	6	37.5%
	Agree	2	15.4%	-	-	2	12.5%
Language differences will make the sharing of knowledge in an online class less effective	Disagree	7	53.8%	2	66.7%	9	56.3%
	Neutral	5	38.5%	1	33.3%	6	37.5%
	Agree	1	7.7%	-	-	1	6.3%

Table 35 Constraints in OLCs

		Experience in online programme				Total	
		No		Yes			
Face-to-face contact with other people is important for online collaboration	Agree	13	100.0%	3	100.0%	16	100.0%
The groupwork sessions will help me form personal relationship with other people	Disagree	2	15.4%	-	-	2	12.5%
	Neutral	5	38.5%	1	33.3%	6	37.5%
	Agree	6	46.2%	2	66.7%	8	50.0%
The groupwork sessions will help me establish trust with other people	Disagree	1	7.7%	-	-	1	6.3%
	Neutral	3	23.1%	1	33.3%	4	25.0%
	Agree	9	69.2%	2	66.7%	11	68.8%
The workshop makes me confident in contributing to the future online discussions	Disagree	1	7.7%	-	-	1	6.3%
	Neutral	4	30.8%	1	33.3%	5	31.3%
	Agree	8	61.5%	2	66.7%	10	62.5%

Table 36 Face-to-face interaction in OLCs

APPENDIX D

Post-module questionnaire

THE UNIVERSITY of York

Part II

A Survey on

Collaborative Online Learning Communities in

Health Economics for Health Care Professionals

This questionnaire is the follow-up survey that forms parts of my PhD research regarding collaborative online learning communities in distance education. I would be very grateful if you can spend about 10 minutes, or so, to fill in this questionnaire.

The main purpose of the questionnaire is to gain insights whether the concepts of communities are essential for learning processes in an online context. In addition, it is intended to discover some social factors that can affect effective online interaction and collaboration. Further, it also aims to investigate and understand the constraints people might be expected to experience in online distance education.

The questionnaire is divided into four sections as follows:

Section A: General Information This section aims to get the contact details and some general information.
Section B: Social Interaction in Online Learning Communities This section aims to gain some insights about students' experiences from social interaction in online learning communities.
Section C: Social Factors in Online Learning Communities This section aims to gain some understandings about the importance of the social factors that can have an influence on social interaction in online learning communities.
Section D: Constraints in Online Learning Communities This section aims to identify actual constraints, especially space, time, culture, and language in online learning communities.

The information that you provide will remain STRICTLY CONFIDENTIAL, and will only be used for the purposes of this study. The results of the survey will be in the form of aggregated data and no answers will be associated with individual respondents.

Section A: General Information

This section aims to get the contact details and some general information.

1. Contact Details

Title: _____

First Name: _____

Surname: _____

E-mail: _____

Section B: Social Interaction Online Learning Communities

This section aims to gain some insights about students' experiences from social interaction in online learning communities.

Online social interaction

According to your learning experience in Module 1, please choose a response that closely matches your feelings:

	Agree	Neutral	Disagree
Interaction with other class members reduces social isolation	8 (50%)	4 (25%)	1 (6.3%)

Interaction with other class members makes me feel more enthusiastic	11 (68.8%)	2 (12.5%)	- -
Interaction with other class members helps me gain new knowledge	13 (81.3%)	- -	- -
Participation in class discussion helps me develop a personal relationship with other members	6 (37.5%)	4 (25%)	3 (18.8%)
Participation in class discussion helps me create my sense of belonging to the class	8 (50%)	3 (18.8%)	2 (12.5%)
Interaction with other class members offers me a positive learning experience	11 (68.8%)	2 (12.5%)	- -

Other comments ----------

Section C: Social Factors in Online Learning Communities

This section aims to gain some understandings about the importance of the social factors that can have an influence on social interaction in online learning communities.

1. Identity

Please read the following questions and choose a response, which most closely matches your learning experiences:

Is knowing others' identity important for interaction in an online class?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
10 (62.5%)	3 (18.8%)	- -

Does geographic distance in an online education make identity more difficult to establish?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
1 (6.3%)	11 (68.8%)	1 (6.3%)

Do you think that identity take time to establish in an online education?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
11 (68.8%)	2 (12.5%)	- -

Do you think that you have developed identity in this class?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
7 (43.8%)	- -	6 (37.5%)

Other comments ----------

2. Trust

Please read the following questions and choose a response, which most closely matches your learning experiences:

Is trust important for interaction in an online class?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
7 (43.8%)	3 (18.8%)	3 (18.8%)

Do you think that trust can be established in an online class?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
7 (43.8%)	3 (18.8%)	3 (18.8%)

Does geographic distance in an online education make trust more difficult to establish?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
1 (6.3%)	10 (62.5%)	2 (12.5%)

Do you think that trust take time to establish in an online education?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
11 (68.8%)	1 (6.3%)	1 (6.3%)

Do you think that you have developed some forms of trust in this class?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
9	-	4
(56.3%)	-	(25%)

Other comments ----------

3. Personal Relationships

Please read the following questions and choose a response, which most closely matches your learning experiences:

Is a personal relationship important for interaction in an online class?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
8	5	-
(50%)	(31.3%)	-

Do you think that a personal relationship can be established in an online class?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
10	1	2
(62.5%)	(6.3%)	(12.5%)

Does geographic distance in an online education make a personal relationship more difficult to establish?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
2	10	1
(12.5%)	(62.5%)	(6.3%)

Do you think that a personal relationship take time to establish in an online education?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
11	-	2
(68.8%)	-	(12.5%)

Do you think that you have developed a personal relationship in this class?

❑ *Yes*	❑ *No*	❑ *Not sure at this stage*
9	1	3
(56.3%)	(6.3%)	(18.8%)

Other comments ----------

Section D: Constraints in Online Learning Communities

This section aims to identify actual constraints, especially space, time, culture and language, in online learning communities.

1. Space constraints

Please read the following questions and choose a response, which most closely matches your learning experiences:

	Agree	**Neutral**	**Disagree**
Learning over distance is lonely	1 (6.3%)	3 (18.8%)	9 (56.3%)
Learning over distance results in fewer interactions with other class members	8 (50%)	3 (18.8%)	2 (12.5%)
Learning over distance is less motivating than learning in the classrooms	3 (18.6%)	3 (18.8%)	7 (43.8%)

Other comments ----------

2. Time constraints

Please read the following questions and choose a response, which most closely matches your learning experiences:

	Agree	**Neutral**	**Disagree**
Different time zones make it more difficult for real-time collaboration	1 (6.3%)	4 (25%)	8 (50%)
Different time zones make it less motivating for real-time collaboration	- -	5 (31.3%)	8 (50%)

Other comments ----------

3. Cultural differences

Please read the following questions and choose a response, which most closely matches your learning experiences:

	Agree	Neutral	Disagree
Cultural differences make it more difficult for people in the class to understand each other	3 (18.8%)	1 (6.3%)	9 (56.3%)
Cultural differences make it more difficult to collaborate online	1 (6.3%)	2 (12.5%)	10 (62.5%)
Cultural differences make it more difficult to establish trust in the class	- -	2 (12.5%)	11 (68.8%)
Cultural differences make it more difficult to establish personal relationships in the class	1 (6.3%)	1 (6.3%)	11 (68.8%)

Other comments ----------

4. Language differences

Please read the following questions and choose a response, which most closely matches your learning experiences:

	Agree	Neutral	Disagree
Language differences make it more difficult for people in an online class to understand each other	3 (18.8%)	6 (37.5%)	4 (25%)
Language differences make it more difficult to collaborate online	4 (25%)	5 (31.3%)	4 (25%)
Language differences make the sharing of knowledge in an online class less effective	2 (12.5%)	9 (56.3%)	2 (12.5%)

Other comments ----------

Finally, please feel free to add whatever comments or questions

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Thank you for your time completing this questionnaire. Any information disclosed will remain STRICTLY CONFIDENTIAL. The results of the survey will be in the form of aggregated data and no answers will be associated with individual respondents. A report summarising the results of this survey will be available to all respondents. If you would like a copy, please tick [✓] here ❑

For more information about the research, please visit the website at http://www-users.cs.york.ac.uk/~adisornn/. If you have further queries, please contact the author at the address below:

Adisorn Na Ubon
Department of Computer Science
University of York
York YO10 5DD, UK
Tel: +44 1904 433243 Fax: +44 1904 432767
Email: adisornn@cs.york.ac.uk

APPENDIX E

Codebook for post-module questionnaire

APPENDIX E

Item	Mnemonic	Type	Measure	Possible Values	Missing Values
Section A: General Information					
A01_2	TITLE	String	Nominal	Text	9
A02_2	FIRSTNAM	String	Nominal	Text	9
A03_2	LASTNAM	String	Nominal	Text	9
A04_2	EMAIL	String	Nominal	Text	9
Section B: Social Interaction in Online Learning Communities					
B01_2	ISOLATE	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
B02_2	ENTHUST	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
B03_2	KNWLEDG	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
B04_2	RELATIO	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
B05_2	BLONGIN	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
B06_2	EXPRNCE	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
B07_2	COMMEN01	String	Nominal	Text	-
Section C: Social Factors in Online Learning Communities					
CO1_2	IIMPORT	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
CO2_2	IDFCLT	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
CO3_2	ITKTIME	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
CO4_2	IDEVELOP	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
CO5_2	COMMEN06	String	Nominal	Text	-
CO6_2	TIMPORT	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
CO7_2	TESTBLSH	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
CO8_2	TDFCLT	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9

CO9_2	TTKTIME	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
C10_2	TDEVELOP	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
C11_2	COMMEN07	String	Nominal	Text	-
C12_2	PIMPORT	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
C13_2	PESTBLSH	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
C14_2	PDFCLT	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
C15_2	PTKTIME	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
C16_2	PDEVELOP	Numeric	Nominal	0=No 1=Not sure at this stage 2=Yes	9
C17_2	COMMEN08	String	Nominal	Text	-
Section D: Constraints in Online Learning Communities					
D01_2	SLONELY	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
D02_2	SFEWINTR	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
D03_2	SMOTIVE	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
D04_2	COMMEN02	String	Nominal	Text	-
D05_2	TCOLLAB	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
D06_2	TMOTIVE	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
D07_2	COMMEN03	String	Nominal	Text	-
D08_2	CUNDERST	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
D09_2	CCOLLAB	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
D10_2	CTRUST	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
D11_2	CPERSONL	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
D12_2	COMMEN04	String	Nominal	Text	-

D13_2	LUNDERST	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
D14_2	LCOLLAB	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
D15_2	LKNWLEDG	Numeric	Nominal	0=Disagree 1=Neutral 2=Agree	9
D16_2	COMMEN05	String	Nominal	Text	-

Table 37 Codebook for post-module questionnaire

APPENDIX F

Letter of consent

APPENDIX F

THE UNIVERSITY of York

DEPARTMENT OF COMPUTER SCIENCE

{Date}

Dear Sir/ Madam,

Request for your consent about a research study

My name is Adisorn Na Ubon. I am a research student in the Department of Computer Science at the University of York. You might have met me at the workshops for distance learning in Health Economics for Health Care Professionals in York. You might also have completed my online surveys. I am writing this letter to ask for your kind help in my research study. My research is about how to support the creation of learning communities in distance education. In particular, I am exploring social interaction among online members and the roles of online instructors that affect learning.

What I want to do is to use the messages, which you and others have posted to the WebCT bulletin boards from Module 1 to Module 4. I will analyse each message and categorise it, and then do some anonymous statistics on the categorised messages. The results of the statistics will give me some ideas about social interactions and communication in online learning.

Moreover, in order to understand how social interactions among online learners and the roles of online instructors affect learning outcomes, I would like to obtain the formal assessment results from each module. It will be one of the variables used in the statistical analysis. To do so, I need your consent to use transcripts of your discussions and your assessment results for this purpose. There are some assurances that I can give you:

- You may withdraw from the process at any time.
- The information will be kept in a secure place and will be destroyed at the conclusion of the study.
- The information will only be used for the purposes of this study.
- The statistical results may be published, but they will be anonymous at all times.
- My doctoral dissertation and any other publications deriving from this research will be available for you to see upon request.

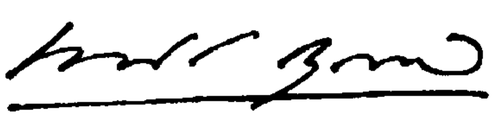
If you are agreeable, I would be grateful if you could sign the slip below and return it to me no later than 31st October 2003 by one of the following options:

- **POST:** Department of Computer Science, University of York, Heslington, York, YO10 5DD UK
- **FAX:** +44 1904 432767
- **ONLINE:** http://www-users.cs.york.ac.uk/~adisornn/loc.htm

If you have any questions about the nature of the research or about the data processing, or if you would like to discuss it with me, please write e-mail to adisornn@cs.york.ac.uk or call +44 1904 433243. If you want to make contact with my supervisor, please write e-mail to Chris Kimble at kimble@cs.york.ac.uk.

Thank you for taking the time to consider my request.

Yours sincerely,



Adisorn Na Ubon

Consent to Participate

❑ I **agree to** the use of my conferencing messages and assessment results in the study described above.

❑ I **do not agree to** the use of my conferencing messages and assessment results in the study described above.

Name (print) _____

Date _____

Signature _____

Please return to Adisorn Na Ubon, Department of Computer Science, University of York, Heslington, YO10 5DD, UK

APPENDIX G

Coding guidelines

APPENDIX G

Category	Indicator	Extended definition	Coding guidelines	Examples
Affective responses	Emotion	• The adjectives attributed to social presence that describes emotions, feelings, and mood such as love, pleased, exciting, hated, worry, sorry, angry, etc. • The use of informal syntax or linguistic features of text-based communication to convey emotion, feelings and mood in online communication such as the use of excessive punctuations and emoticons.	• Emotion is coded when the message indicates a conventional expression of emotions, feelings and mood. • Emotion is coded when the message indicates an unconventional expression of emotions, feelings, and mood such as the use of paralinguistic features of ACMC to make communication looks more informal, spoken style just like in face-to-face exchange.	• "It was such a pleasure to meet everyone at the workshop." • "Good to see the ball rolling." • "So this is a very good deal!" • "Sorry it has taken me a while to get back to you on this one." • "…here is my VERY FIRST ATTEMPT!!!!" • "Phew - my head hurts." • "Differing marginal returns? :~/"
	Humour	• The expression of a sense of humour. This also includes text-based communication that expresses what is amusing, comical, ironical, satirical, absurd, etc.	• Humour is coded when the message shows or implies the state of being humorous, including the expression of irony, satire, ridicule, and overstatement or understatement.	• "Unit 1.4 nearly finished me off…!!" • "Back off holiday to bad weather and an assignment!"
	Personal values	• The expression of personal views, beliefs, or attitudes. This also includes the expression of how a person as an individual perceives and relates to others, such as personal feelings, preference, bias, prejudice, etc.	• Personal values are coded when the message shows or implies a personal view of the communicators. • Personal values can be coded to the expression that shows an individual perception towards either the course related or the general statement.	• "I hope you all found it useful." • "I guess you are all working hard on your assessed piece of work." • "I think it is important to…" • "I believe the study leaves 2 possibilities of selection bias."

APPENDIX G

Category	Indicator	Extended definition	Coding guidelines	Examples
	Self-disclosure	• The expression of personal story or vulnerability, such as misunderstanding, lacking of confidence, making mistakes, being uncertain of the facts, etc.	• Self-disclosure is coded when the message shows or implies self-vulnerability about the course contents. • Self-disclosure is coded when the communicator expresses his/her personal story (usually related to the course but not directly to the contents).	• "I am stuck ... so help would be appreciated." • "I doubt that I did it correctly." • "I hard a hard time to find something sensible to answer to this exercise." • "I am a little bit confused now." • "Apologies that I did not seem to contribute to the discussions but I had some problems with the bulletin board on my side which resulted in my postings not being seen."
Cohesive responses	Group reference	• The use of inclusive pronouns, such as we, us, and our, to refer to the group or other group members.	• Group reference is coded when the message refers to the group (two or more persons) using plural inclusive pronouns to indicate closeness or group membership.	• "Let us imagine that…" • "So why don't we…" • "Can anyone think how else we might plot this data?" • "From our diagram, we can also see that…"
	Phatics	• The verbal communication used to establish social relationships rather than to impart information.	• Phatics is coded when the message mainly serve social or emotive purposes. • Phatics is coded to the message that creates an atmosphere of shared feelings, goodwill, or sociability.	• "Happy New Year for all!" • "Sorry to have been so silent, the organisation of the wedding on Saturday took me some time." • "I just want to let you know that I'll be in the sunny climbs of Fuerteventura next week." • "Ah, I had hoped you had given this a try already, when I logged on, expecting your beautiful looking PDF files. I was not disappointed. I am so jealous…" • "It's good to see that the bulletin boards have come alive again."

APPENDIX G

Category	Indicator	Extended definition	Coding guidelines	Examples
	Salutation/ Closure	• Salutation – the words used at the beginning of the message to greet or welcome in a friendly and respectful manner. • Closure – the use of a sentence or phrase to close or end a message.	• Salutations/closure is coded when the message contains greeting, salutation and closing remarks (both formal and informal). • Salutations/closure is usually appeared at the beginning and the end of a message. • In some cases, people use name as a greeting or closing word of the message.	• "Dear all," • "Hi folks," • "That's all for now." • "Best wishes and have a good weekend," • "All the best,"
	Vocatives	• The expression used to address or refer to other class members by name.	• Vocatives are coded when the message addresses or refers to the person by name. • Vocatives are coded when the message contains other member's name(s) that helps clarify to whom the sentence is directed.	• "I think Susan is correct that…" • "Tony is right when he says…" • "Mark added a good point regarding…" • "Thanks David for these points." • "I have the same thoughts as John."
Interactive responses	Acknowledgement	• The acknowledgement of the others' posted messages or their contributions. • The expression of praise, admiration, or congratulations.	• Acknowledgement is coded when the message shows or implies recognition of others' messages or a response to a particular person(s). • Acknowledgement is coded when the message shows or implies an expression of praise, admiration, or congratulations to a particular person(s).	• "David made some good points regarding…" • "Thank you all for putting so much effort into the assessed piece of work." • "Thanks George for your answers and the attached graph which looks great." • "Helen correctly noted that…"

APPENDIX G

Category	Indicator	Extended definition	Coding guidelines	Examples
	Agreement/ Disagreement	• The use of text-based communication to reflect agreement, concurrence, compliance with others' messages or vice versa.	• Agreement/disagreement is coded when the message shows or implies an expression of agreement, acceptance and approval, and vice versa. • Agreement/disagreement includes the expression of agreement or disagree- ment with other ideas, which can be related or unrelated to the course contents. • Statements of tutors showing agreement or disagreement with student's contribution are coded using this indicator. • Statements of students showing agreement or disagreement with other student's contribution are coded using this indicator.	• "John's point is well-taken, but I do not see why…" • "This is a great example and I agree." • "I would agree with Beth that…" • "I personally don't agree because…"
	Help/ Assistance	• The instance of helping or assisting other people, such as answering questions, offering a moral support, sharing information and resources, and providing personal advice.	• Help/assistance is coded when the message shows or implies support to the other participants. • The sharing of information (both related and unrelated to the course contents) by students and tutors is coded as help/ assistance. • Help, suggestion, or personal advice by students or tutors is coded as help/ assistance. • Tutors' or students' answer to other students' question is coded as help/ assistance. • Students' answer to tutors' question is not coded as help/ assistance.	• "If any of you guys do not have Adobe on your PC, I will be glad to do the conversion for you." • "I've turned the attachment into a pdf file for you and attached it to this message." • "I would advise you to…" • "It will be worthwhile for you guys to…" • "Just a little story to illustrate this."

APPENDIX G

Category	Indicator	Extended definition	Coding guidelines	Examples
	Inquiry	• The communication used to seek for an answer, get information, make an inquiry, and ask for help or advice.	• Inquiry is coded when the message shows or implies questioning, making an inquiry, requesting for help or advice from other participants.	• "Do you think that…" • "I can't figure it out. Who can help?" • "Can anyone think how else we might plot this data?" • "And do you agree with this?" • "Is there anyone out there who is an expert on Excel?"
	Invitation	• The communication used to encourage a response or comment, ask for the presence, and promote others' contributions.	• Invitation is coded when the message shows or implies an expression of encouragement to elicit contributions from other participants. • Invitation can also be presented in a question format.	• "Any thoughts??" • "Any responses welcome!" • "Guys, please let me know what you think!" • "I'm looking forward to seeing your postings on WebCT." • "I'm awaiting the first contribution to the BB when you're ready."

Table 38 Social presence coding guidelines

APPENDIX H

Discussion threads in WebCT®

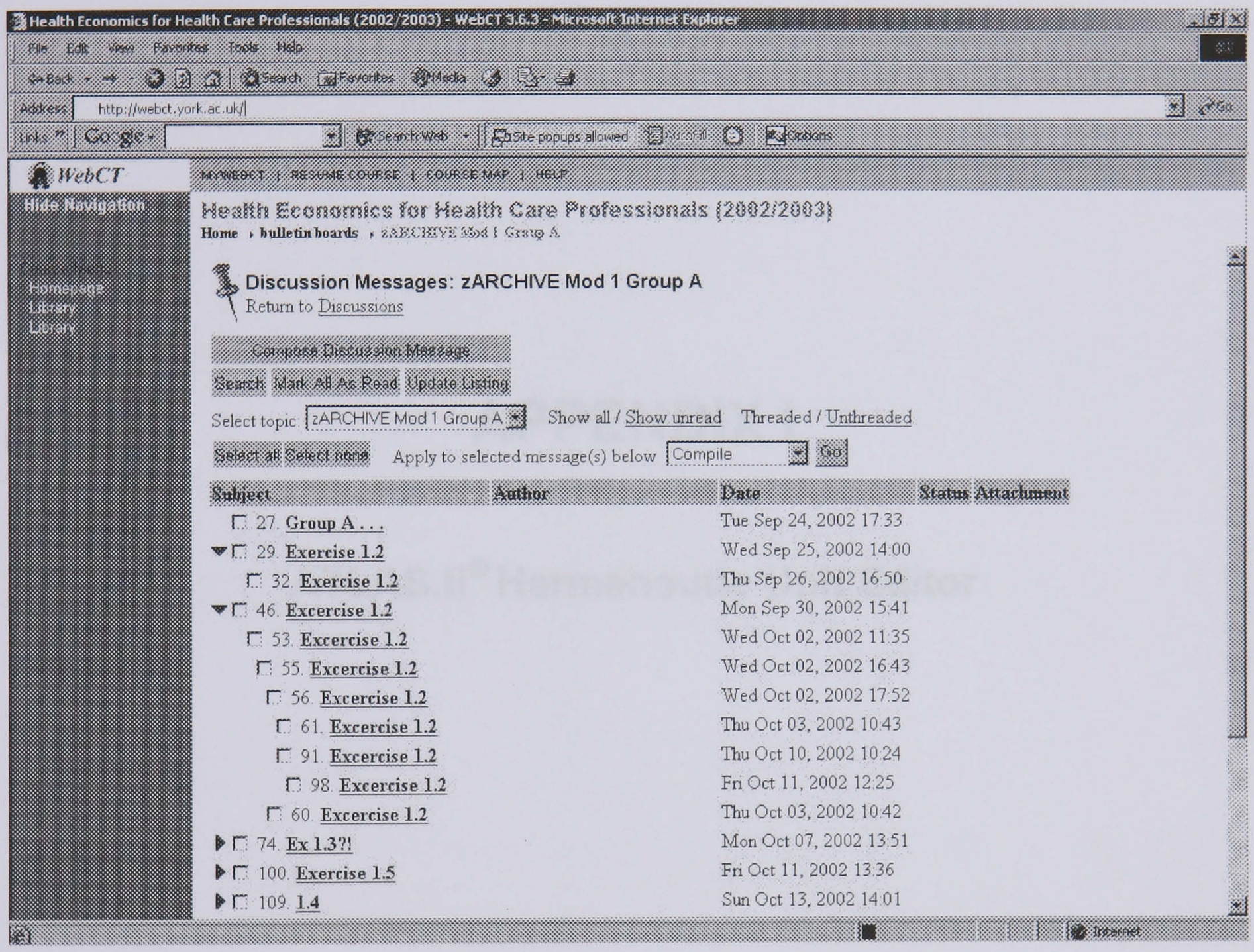


Figure 19 Discussion threads in WebCT®

APPENDIX I

ATLAS.ti® Hermeneutic Unit Editor

APPENDIX I

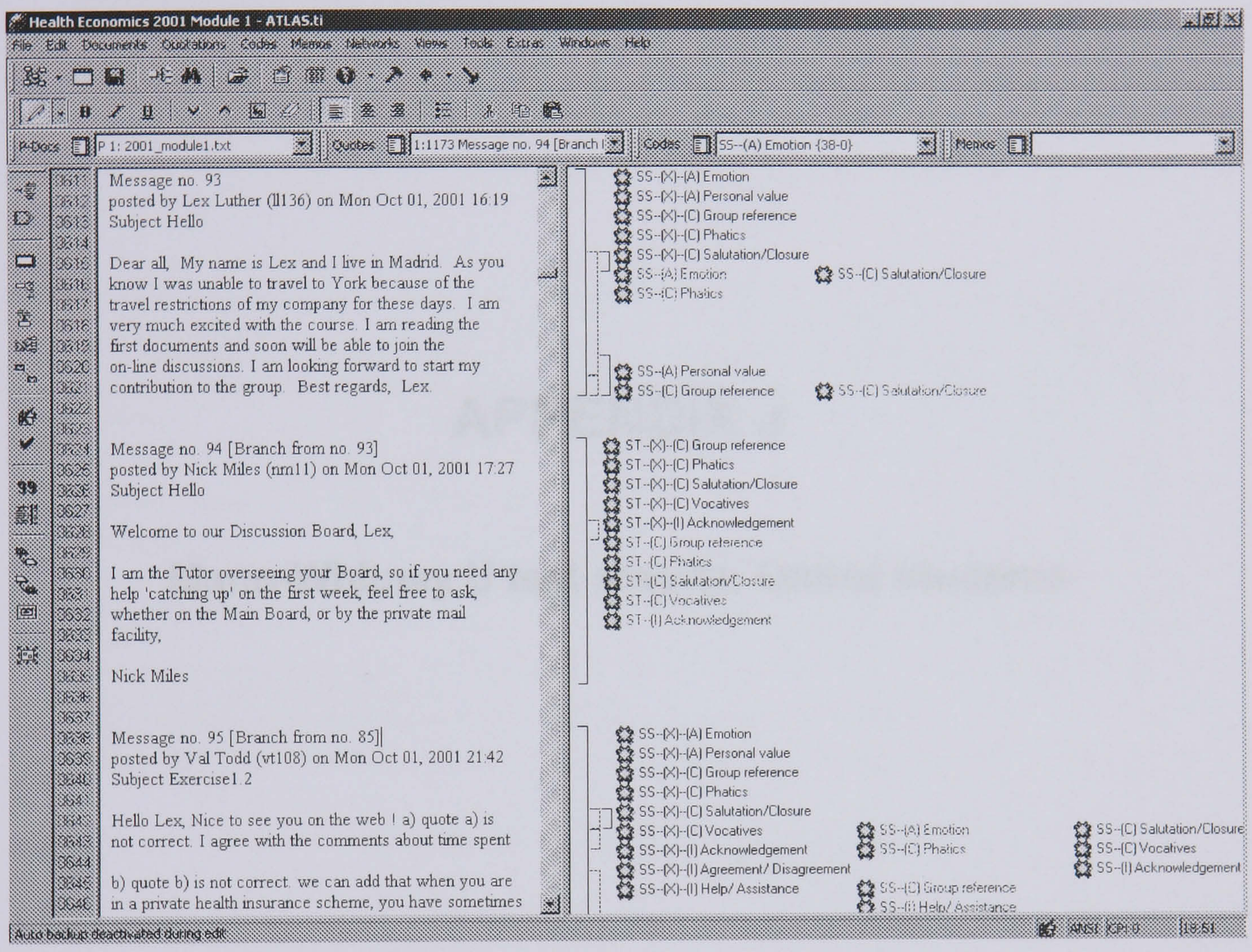


Figure 20 ATLAS.ti® hermeneutic unit editor[30]

[30] All the names appeared in this figure are fictitious names

APPENDIX J

Mann-Whitney U test results: Online students

Social presence categories	1st Cohort (2001)				2nd Cohort (2002)				Mann-Whitney U test	
	M1	M2	M3	M4	M1	M2	M3	M4	Z	Sig.
Affective responses	33%	26%	24%	26%	38%	29%	29%	35%	-1.753	.114
Cohesive responses	27%	31%	43%	35%	36%	42%	33%	23%	.000	1.000
Interactive responses	26%	27%	30%	30%	23%	27%	26%	25%	-1.764	.114
No. of messages	*83*	*63*	*94*	*41*	*122*	*94*	*98*	*53*	*-1.307*	*.200*

Note:
Mann-Whitney U test compares the difference in the level of each social presence category across modules between students in the 2001 and 2002 cohorts.
Unit = Percentage of social presence category to the number of messages in each module
* Significant level < .05

Table 39 Social presence categories - Students

Affective response indicators	1st Cohort (2001)				2nd Cohort (2002)				Mann-Whitney U test	
	M1	M2	M3	M4	M1	M2	M3	M4	Z	Sig.
Emotion	39%	27%	22%	24%	41%	33%	35%	38%	-1.443	.200
Humour	18%	8%	9%	15%	18%	16%	11%	15%	-.866	.486
Personal values	61%	57%	55%	56%	60%	47%	51%	58%	-.577	.686
Self-disclosure	14%	11%	11%	10%	32%	21%	18%	28%	-2.309	.029*
No. of messages	*83*	*63*	*94*	*41*	*122*	*94*	*98*	*53*	*-1.307*	*.200*

Note:
Mann-Whitney U test compares the difference in the level of each social presence category across modules between students in the 2001 and 2002 cohorts.
Unit = Percentage of social presence category to the number of messages in each module
* Significant level < .05

Table 40 Affective responses - Students

Cohesive response indicators	1st Cohort (2001)				2nd Cohort (2002)				Mann-Whitney U test	
	M1	M2	M3	M4	M1	M2	M3	M4	Z	Sig.
Group reference	24%	29%	54%	44%	29%	34%	32%	13%	-.577	.686
Phatics	12%	8%	3%	15%	14%	29%	16%	4%	-1.155	.343
Salutation/Closure	36%	48%	67%	49%	57%	61%	47%	38%	.000	1.000
Vocatives	35%	41%	48%	32%	43%	46%	38%	36%	-.577	.686
No. of messages	*83*	*63*	*94*	*41*	*122*	*94*	*98*	*53*	*-1.307*	*.200*

Note:
Mann-Whitney U test compares the difference in the level of each social presence category across modules between students in the 2001 and 2002 cohorts.
Unit = Percentage of social presence category to the number of messages in each module
* Significant level < .05

Table 41 Cohesive responses - Students

Interactive response indicators	1st Cohort (2001)				2nd Cohort (2002)				Mann-Whitney U test	
	M1	M2	M3	M4	M1	M2	M3	M4	Z	Sig.
Acknowledgement	35%	48%	41%	37%	34%	37%	31%	43%	-.866	.468
Agree/Disagreement	25%	21%	28%	20%	21%	19%	15%	17%	-1.732	.114
Help/Assistance	24%	24%	36%	34%	16%	30%	28%	17%	-1.155	.343
Inquiry	33%	33%	31%	46%	34%	36%	40%	43%	-1.155	.343
Invitation	11%	8%	13%	15%	10%	14%	14%	4%	-.289	.886
No. of messages	*83*	*63*	*94*	*41*	*122*	*94*	*98*	*53*	*-1.307*	*.200*

Note:
Mann-Whitney U test compares the difference in the level of each social presence category across modules between students in the 2001 and 2002 cohorts.
Unit = Percentage of social presence category to the number of messages in each module
* Significant level < .05

Table 42 Interactive responses - Students

APPENDIX K

Wilcoxon Signed Rank test results: Online tutors

Social presence categories	1st Cohort (2001)				2nd Cohort (2002)				Wilcoxon Signed Rank test	
	M1	M2	M3	M4	M1	M2	M3	M4	Z	Sig.
Affective responses	31%	40%	34%	31%	27%	33%	25%	15%	-1.826	.068
Cohesive responses	40%	50%	45%	35%	40%	56%	50%	38%	-1.604	.109
Interactive responses	43%	46%	51%	43%	45%	55%	46%	37%	.000	1.000
No. of messages	*103*	*37*	*69*	*58*	*126*	*113*	*80*	*62*	*-1.826*	*.068*

Note:
Wilcoxon Signed Rank test compares the difference in the level of each social presence category across modules between tutors in the 2001 and 2002 cohorts.
Unit = Percentage of social presence category to the number of messages in each module
* Significant level < .05

Table 43 Social presence categories - Tutors

Affective response indicators	1st Cohort (2001)				2nd Cohort (2002)				Wilcoxon Signed Rank test	
	M1	M2	M3	M4	M1	M2	M3	M4	Z	Sig.
Emotion	56%	76%	62%	59%	63%	66%	55%	27%	-1.461	.144
Humour	23%	19%	16%	24%	9%	12%	9%	8%	-1.826	.068
Personal values	40%	57%	55%	41%	35%	49%	33%	23%	-1.826	.068
Self-disclosure	6%	8%	1%	0%	1%	4%	3%	0%	-1.826	.068
No. of messages	*103*	*37*	*69*	*58*	*126*	*113*	*80*	*62*	*-1.826*	*.068*

Note:
Wilcoxon Signed Rank test compares the difference in the level of each social presence category across modules between tutors in the 2001 and 2002 cohorts.
Unit = Percentage of social presence category to the number of messages in each module
* Significant level < .05

Table 44 Affective responses - Tutors

Cohesive response indicators	1st Cohort (2001)				2nd Cohort (2002)				Wilcoxon Signed Rank test	
	M1	M2	M3	M4	M1	M2	M3	M4	Z	Sig.
Group reference	36%	38%	52%	24%	36%	58%	41%	18%	-.365	.715
Phatics	23%	54%	25%	26%	17%	33%	38%	19%	-.730	.465
Salutation/Closure	60%	81%	68%	76%	56%	88%	73%	97%	-1.095	.273
Vocatives	40%	27%	35%	16%	52%	47%	49%	19%	-1.826	.068
No. of messages	*103*	*37*	*69*	*58*	*126*	*113*	*80*	*62*	*-1.826*	*.068*

Note:
Wilcoxon Signed Rank test compares the difference in the level of each social presence category across modules between tutors in the 2001 and 2002 cohorts.
Unit = Percentage of social presence category to the number of messages in each module
* Significant level < .05

Table 45 Cohesive responses - Tutors

Interactive response indicators	1st Cohort (2001)				2nd Cohort (2002)				Wilcoxon Signed Rank test	
	M1	M2	M3	M4	M1	M2	M3	M4	Z	Sig.
Acknowledgement	50%	51%	65%	47%	62%	65%	69%	35%	-1.095	.273
Agree/Disagreement	16%	11%	23%	9%	18%	28%	13%	15%	-.730	.465
Help/Assistance	83%	95%	90%	83%	80%	82%	80%	79%	-1.826	.068
Inquiry	35%	30%	43%	38%	36%	41%	33%	29%	-.365	.715
Invitation	33%	46%	35%	41%	29%	58%	34%	27%	-.730	.465
No. of messages	*103*	*37*	*69*	*58*	*126*	*113*	*80*	*62*	*-1.826*	*.068*

Note:
Wilcoxon Signed Rank test compares the difference in the level of each social presence category across modules between tutors in the 2001 and 2002 cohorts.
Unit = Percentage of social presence category to the number of messages in each module
* Significant level < .05

Table 46 Interactive responses - Tutors

APPENDIX L

T-tests: Tests of normality and histograms

Social presence between genders

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Sex	Statistic	df	Sig.	Statistic	df	Sig.
Emotion	Female	.216	81	.000	.861	81	.000
	Male	.214	47	.000	.779	47	.000
Humour	Female	.320	81	.000	.719	81	.000
	Male	.458	47	.000	.446	47	.000
Personal values	Female	.224	81	.000	.869	81	.000
	Male	.124	47	.068	.906	47	.001
Self-disclosure	Female	.312	81	.000	.700	81	.000
	Male	.355	47	.000	.691	47	.000
Group reference	Female	.280	81	.000	.809	81	.000
	Male	.232	47	.000	.818	47	.000
Phatics	Female	.302	81	.000	.672	81	.000
	Male	.317	47	.000	.533	47	.000
Salutation/Closure	Female	.169	81	.000	.869	81	.000
	Male	.146	47	.014	.866	47	.000
Vocatives	Female	.197	81	.000	.868	81	.000
	Male	.201	47	.000	.856	47	.000
Acknowledgement	Female	.185	81	.000	.873	81	.000
	Male	.185	47	.000	.854	47	.000
Agreement/Disagreement	Female	.286	81	.000	.784	81	.000
	Male	.278	47	.000	.735	47	.000
Help/Assistance	Female	.233	81	.000	.813	81	.000
	Male	.238	47	.000	.809	47	.000
Inquiry	Female	.216	81	.000	.844	81	.000
	Male	.230	47	.000	.775	47	.000
Invitation	Female	.419	81	.000	.610	81	.000
	Male	.390	47	.000	.567	47	.000

a. Lilliefors Significance Correction

Table 47 The tests of normality - Social presence between genders

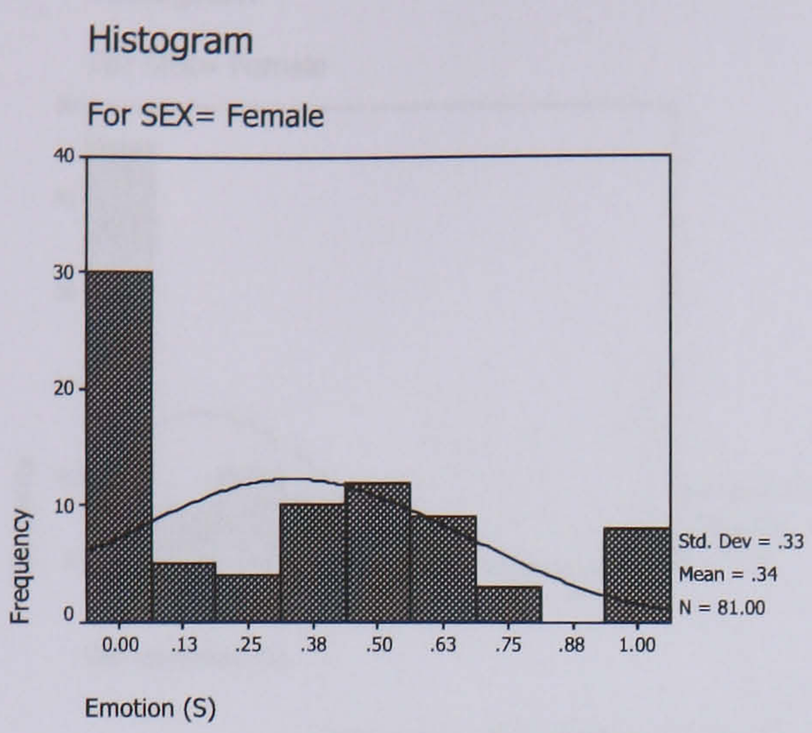


Figure 21 Histogram - Emotion between genders

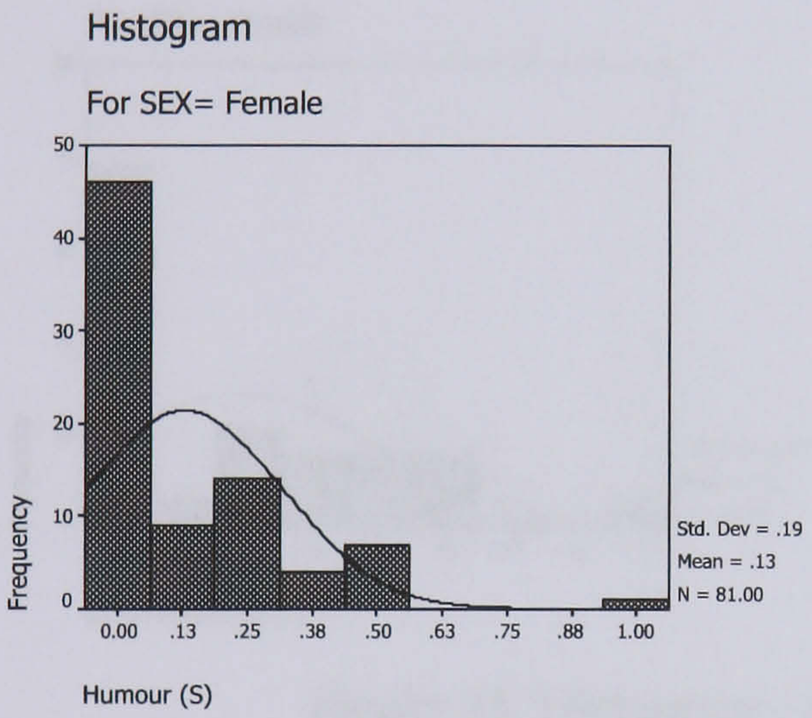


Figure 22 Histogram - Humour between genders

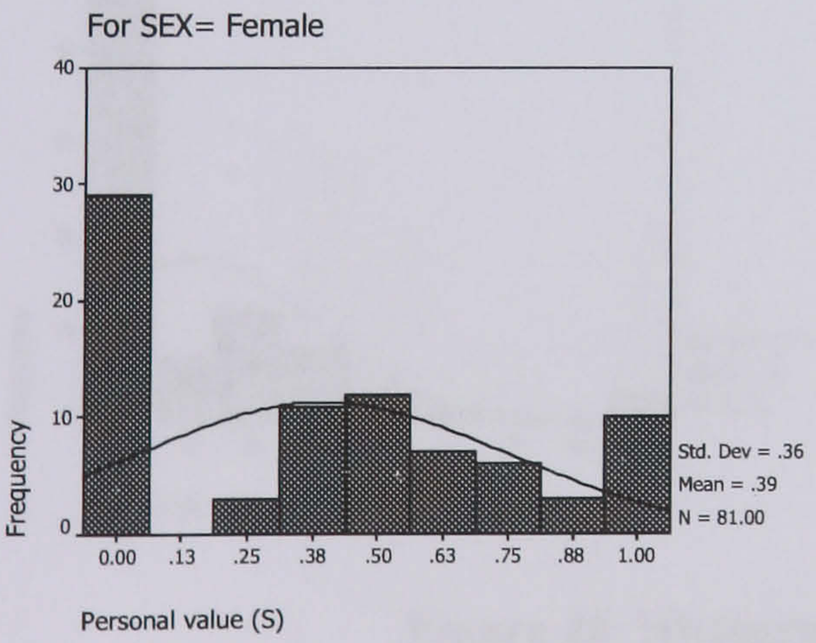


Figure 23 Histogram - Personal values between genders

APPENDIX L

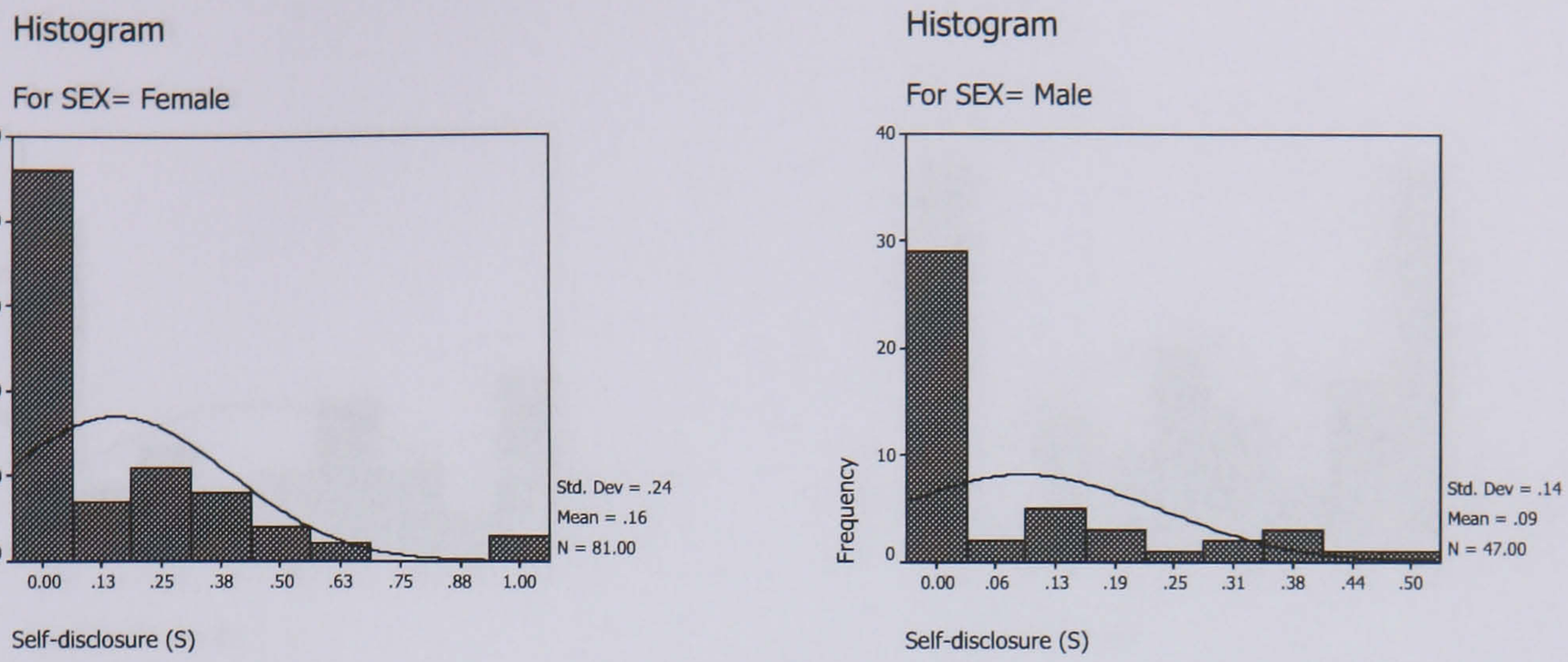


Figure 24 Histogram - Self-disclosure between genders

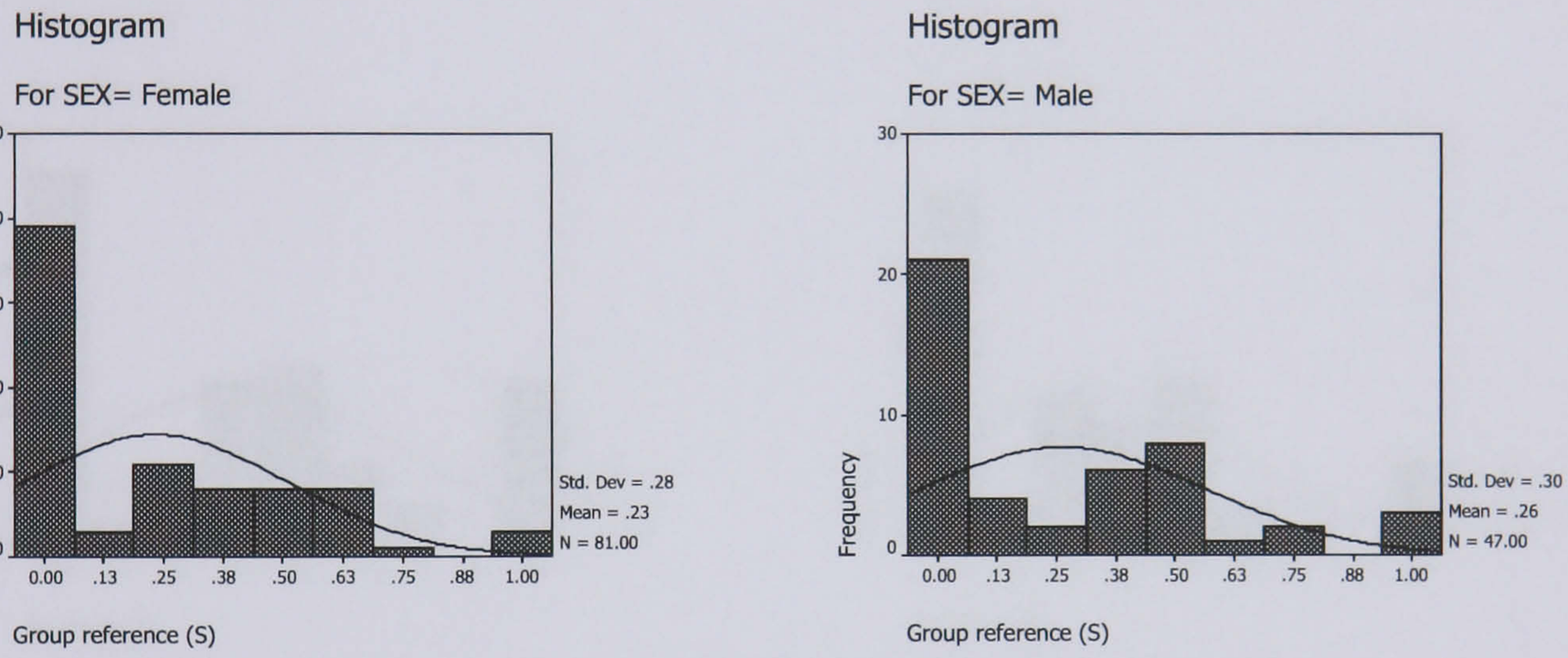


Figure 25 Histogram - Group reference between genders

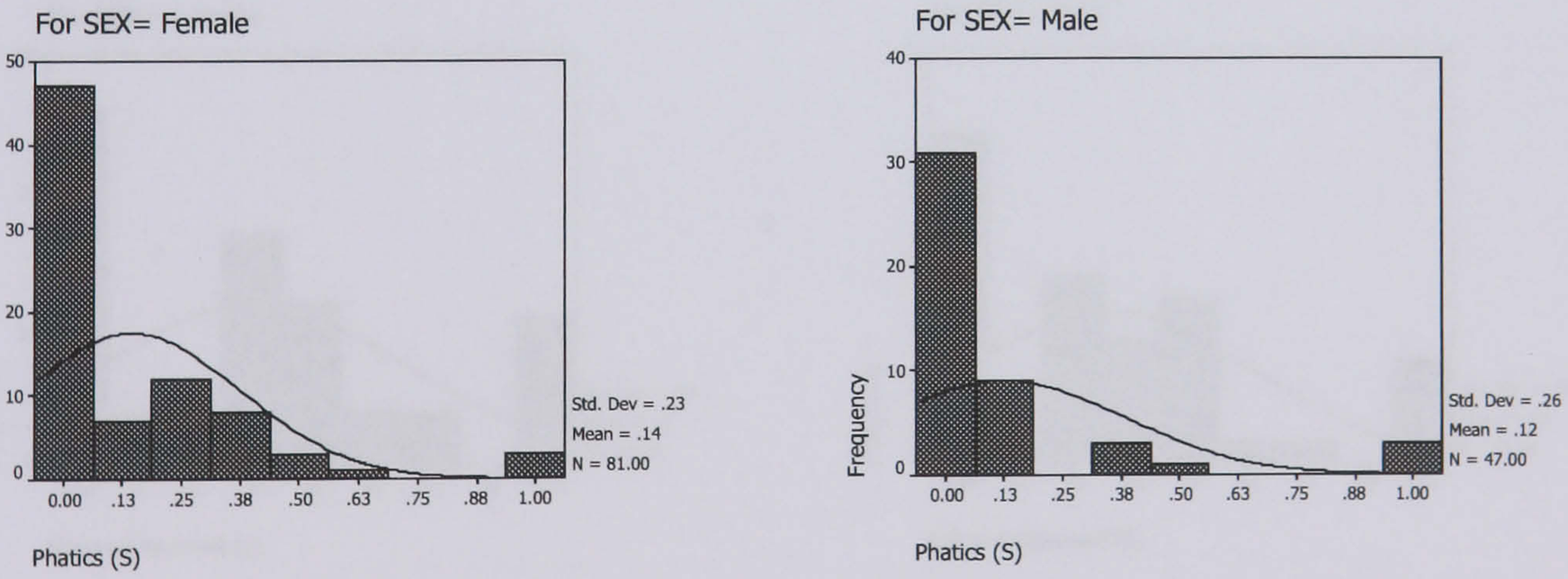


Figure 26 Histogram - Phatics between genders

APPENDIX L

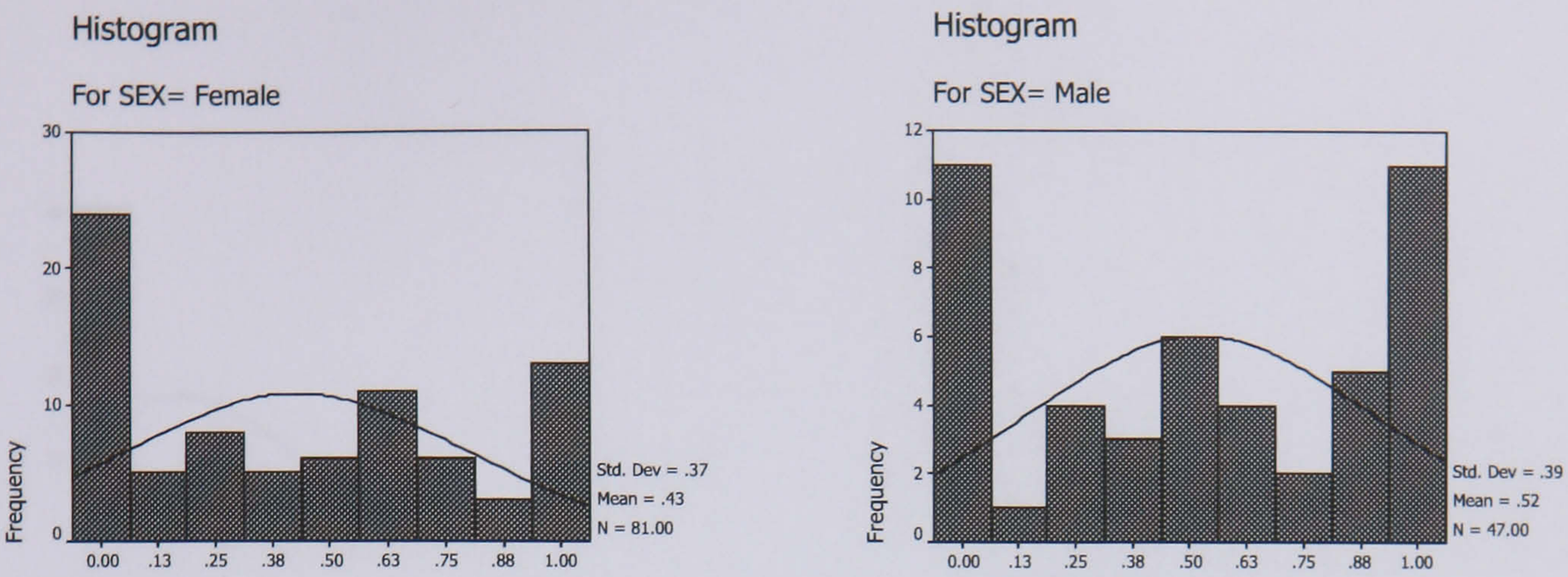


Figure 27 Histogram - Salutation/closure between genders

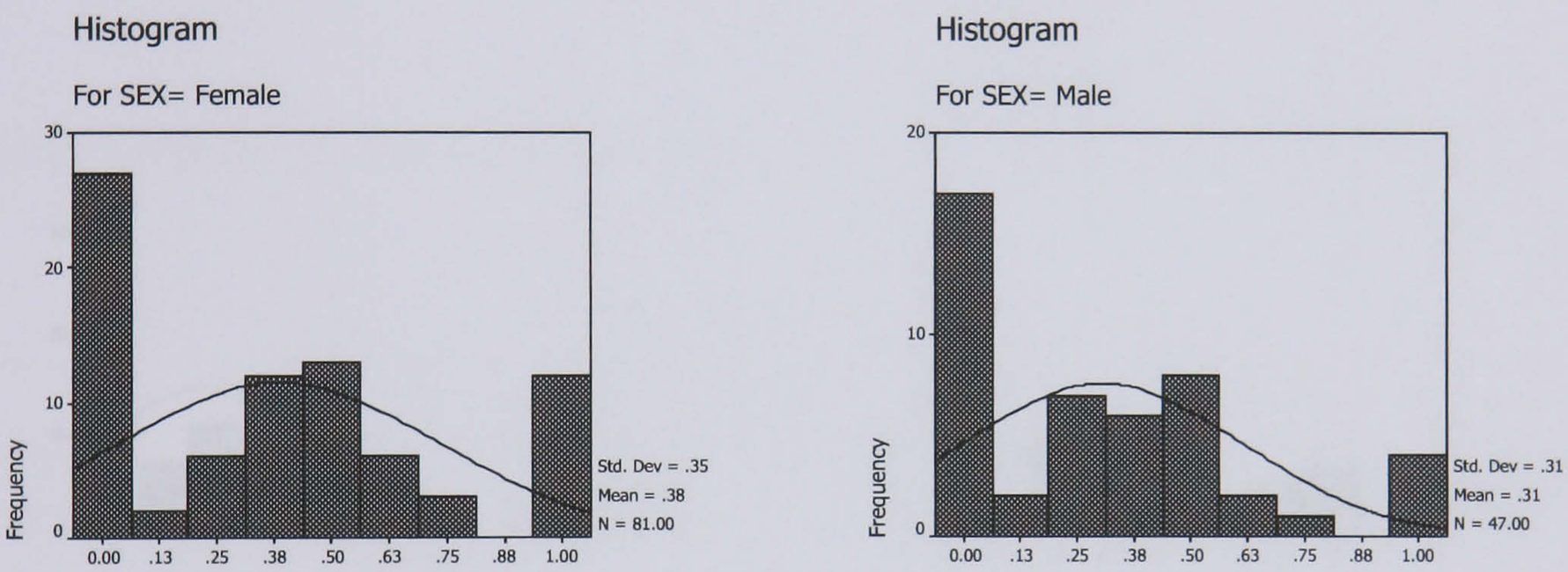


Figure 28 Histogram - Vocatives between genders

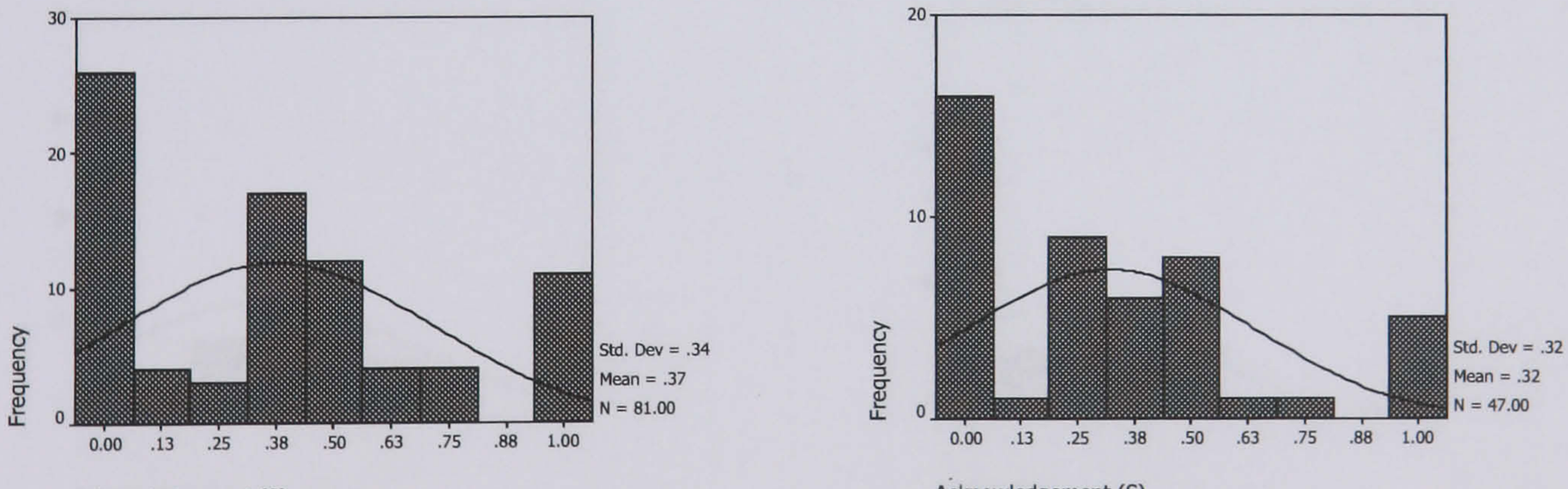


Figure 29 Histogram - Acknowledgment between genders

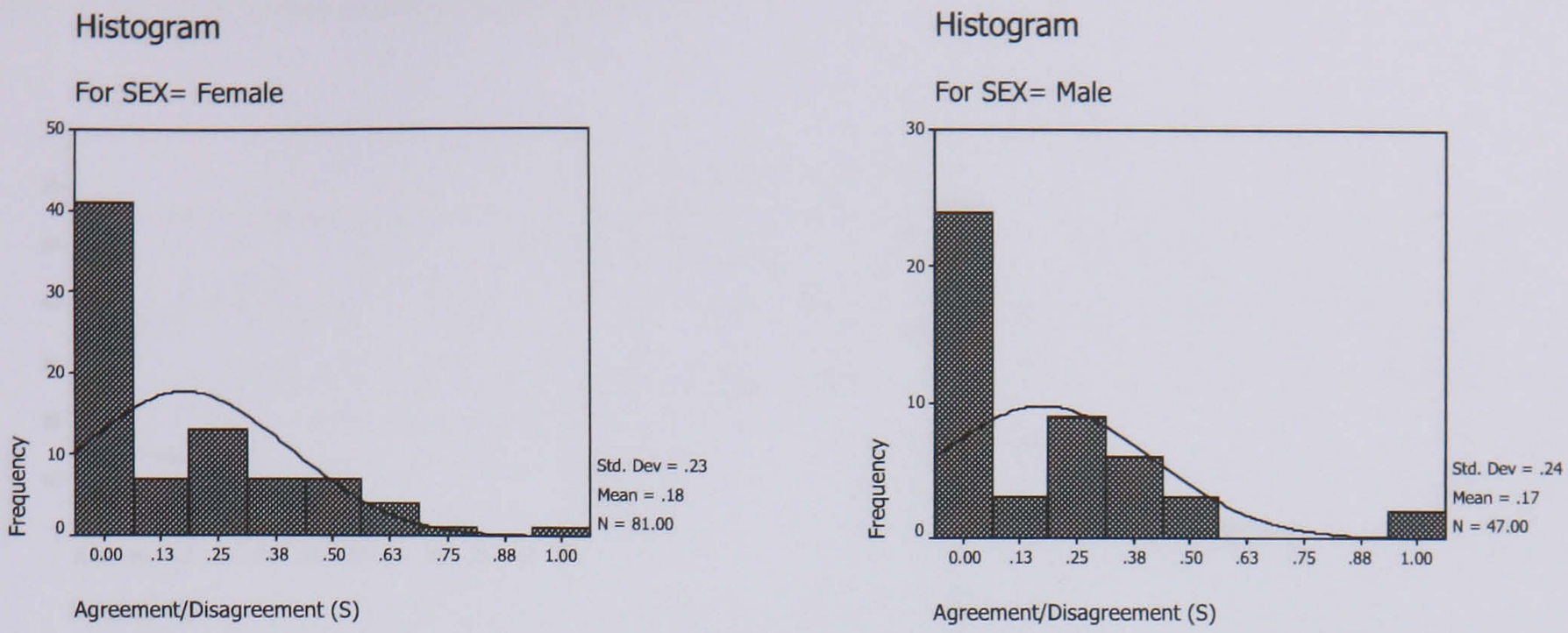


Figure 30 Histogram - Agreement/disagreement between genders

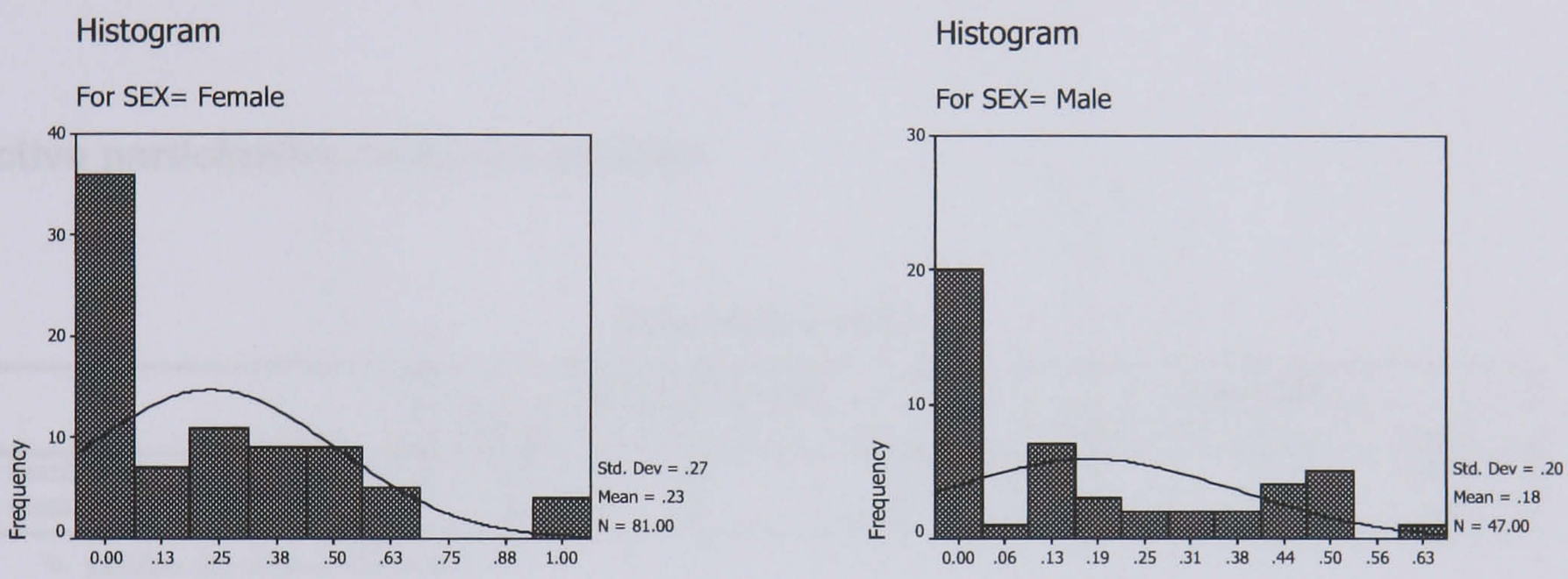


Figure 31 Histogram - Help/assistance between genders

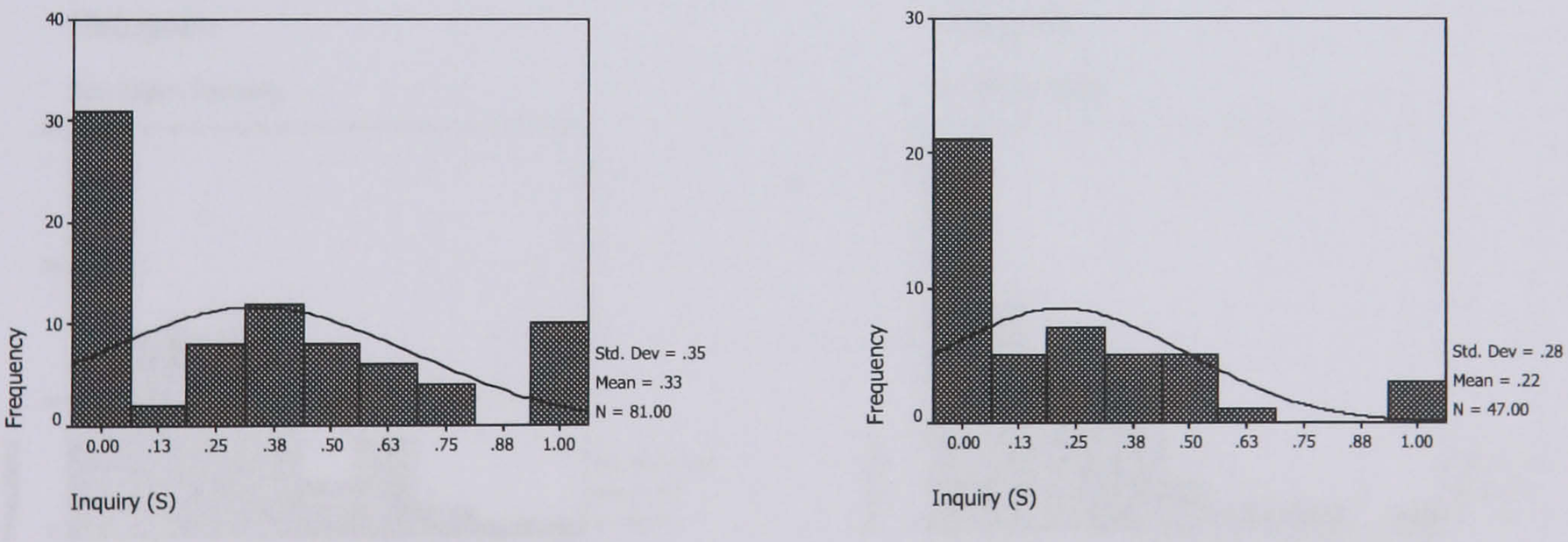


Figure 32 Histogram - Inquiry between genders

APPENDIX L

Figure 33 Histogram - Invitation between genders

Active participation between genders

Tests of Normality

	Sex	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Number of messages	Female	.168	81	.000	.857	81	.000
	Male	.166	47	.002	.850	47	.000

a. Lilliefors Significance Correction

Table 48 The test of normality - Active participation between genders

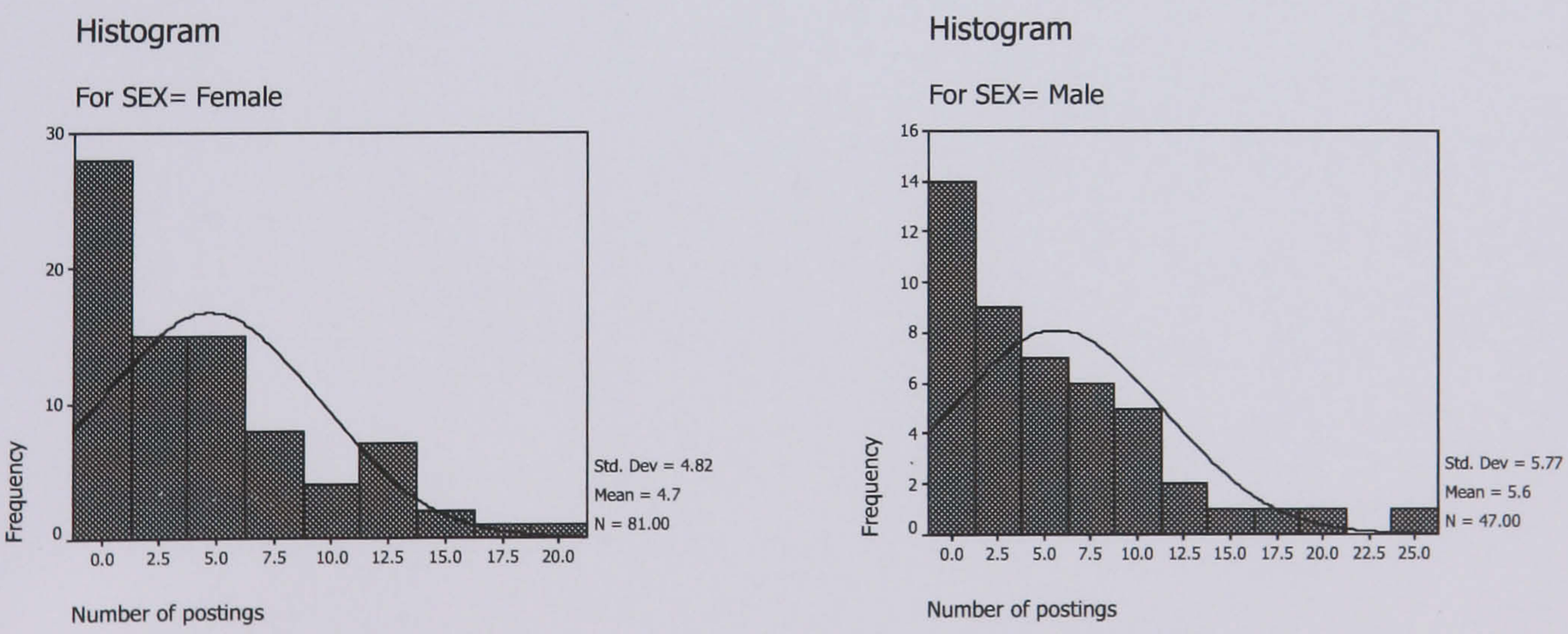


Figure 34 Histogram - Active participation between genders

Learning outcomes between genders

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Sex	Statistic	df	Sig.	Statistic	df	Sig.
Score	Female	.120	81	.009	.974	81	.126
	Male	.066	47	.200*	.983	47	.739

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Table 49 The test of normality - Learning outcomes between genders

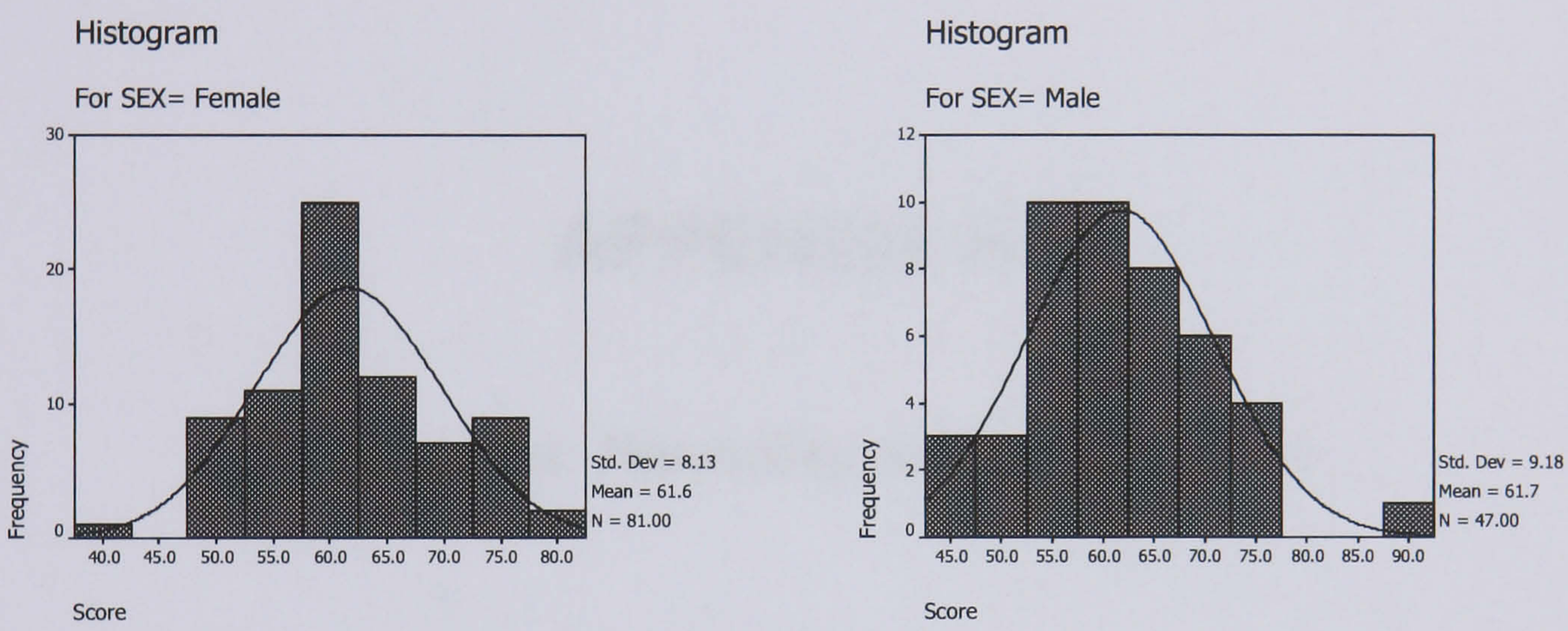


Figure 35 Histogram - Learning outcomes between genders

APPENDIX M

Regression: Normality and scatter plots

APPENDIX M

Social presence and active participation

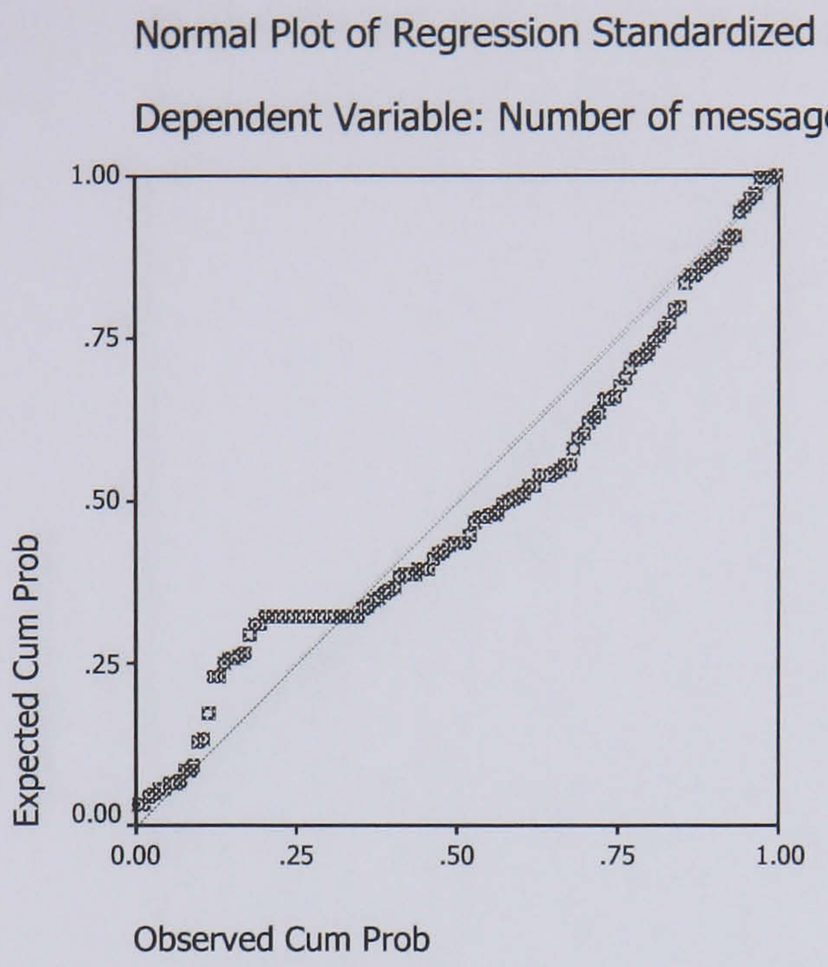


Figure 36 Normality plot - Social presence and active participation

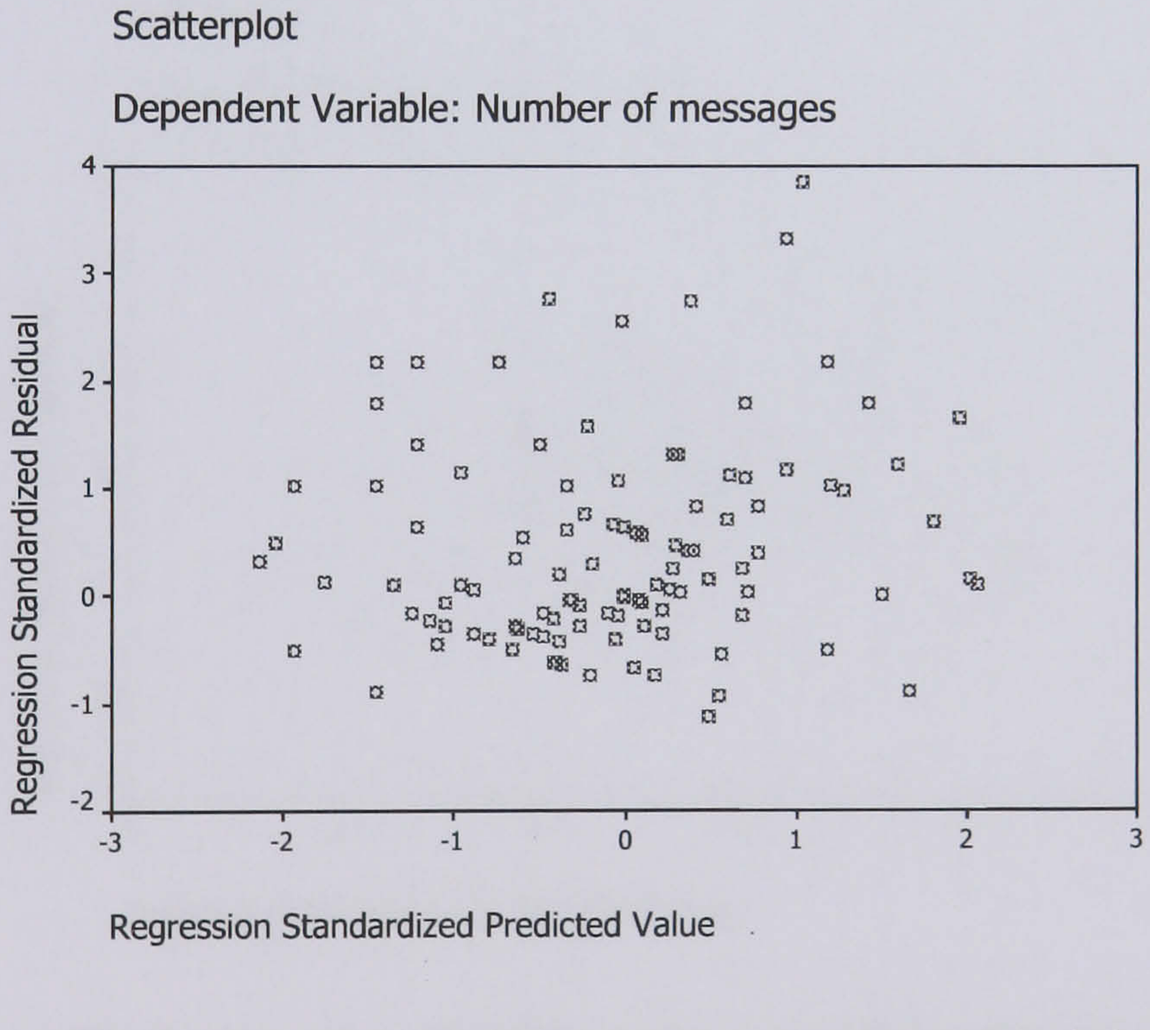


Figure 37 Scatter plot - Social presence and active participation

Social presence and learning outcomes

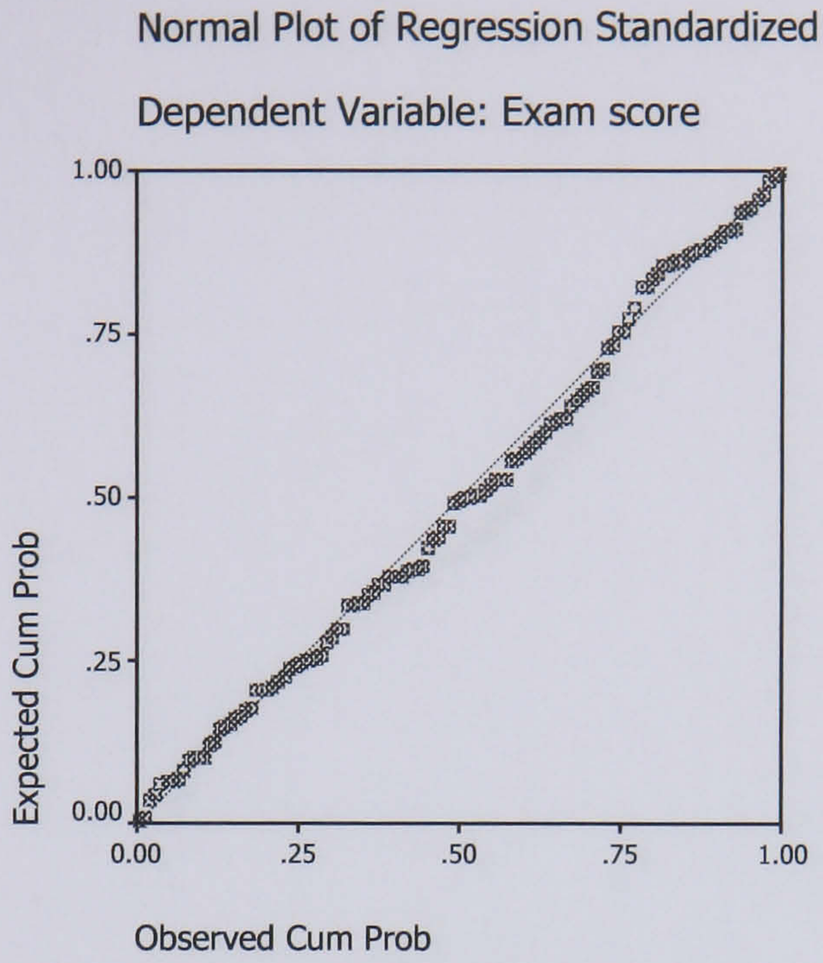


Figure 38 Normality plot - Social presence and learning outcomes

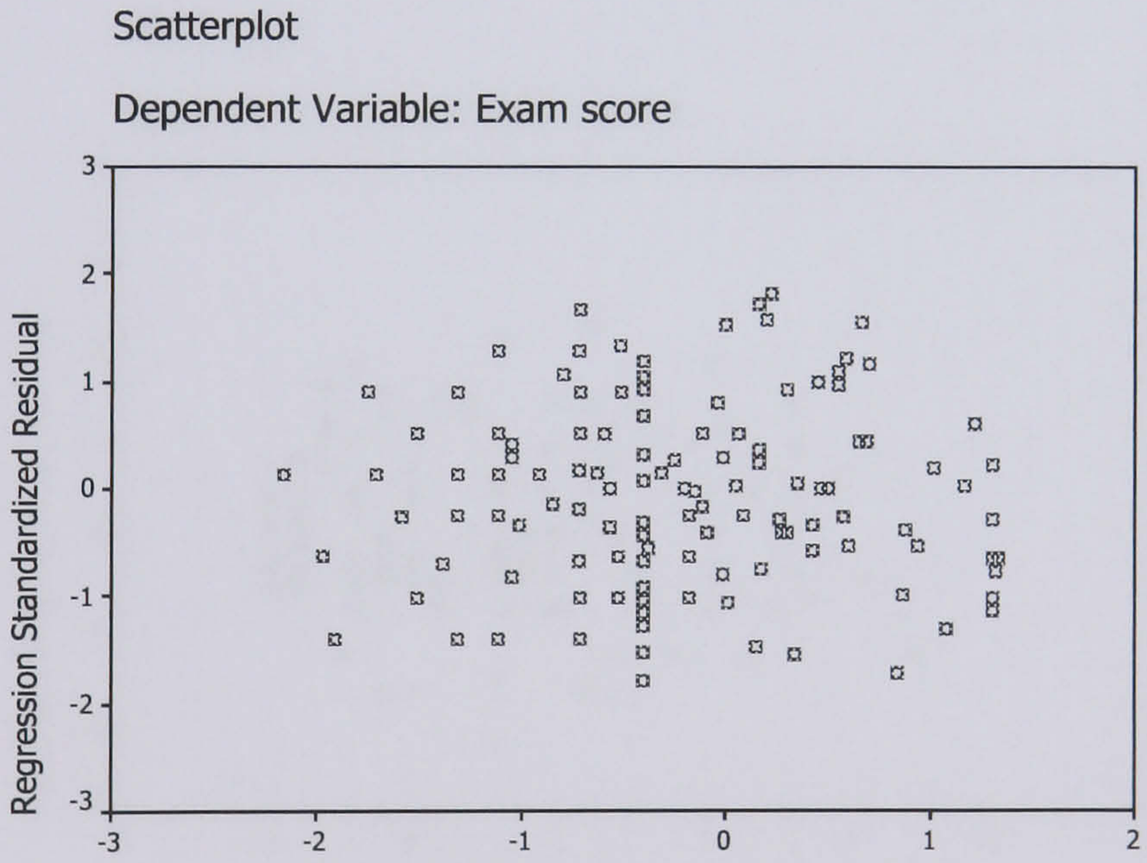


Figure 39 Scatter plot - Social presence and learning outcomes

Active participation and learning outcomes

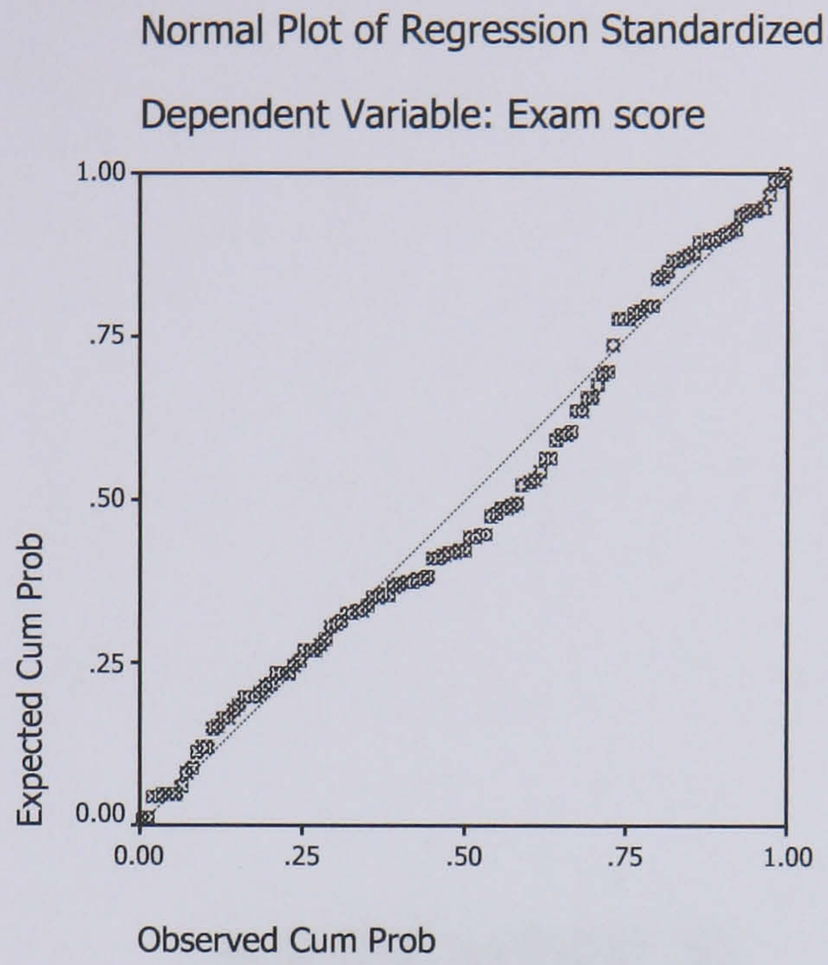


Figure 40 Normality plot - Active participation and learning outcomes

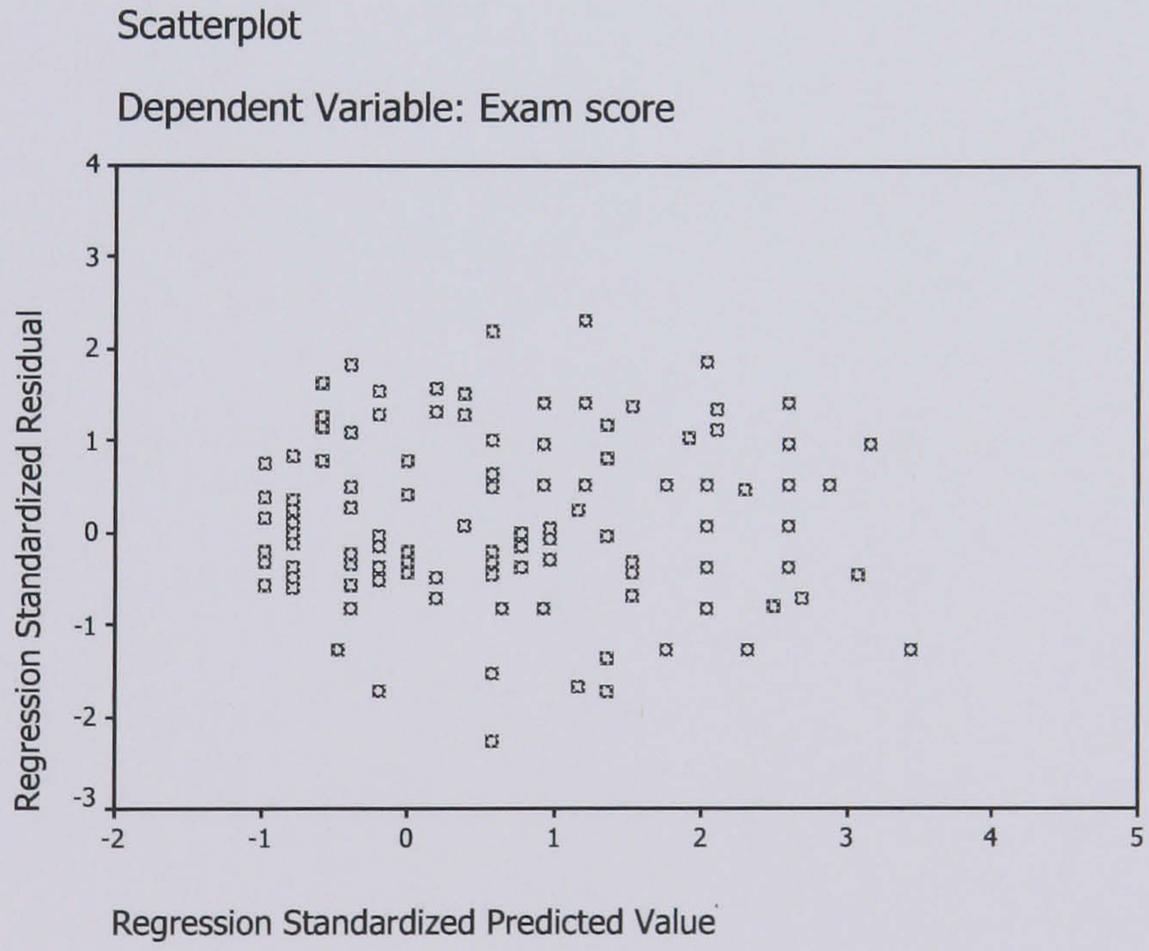


Figure 41 Scatter plot - Active participation and learning outcomes

APPENDIX N

Correlation coefficients: Social presence indicators

		Emotion	Humour	Personal values	Self-disclosure
Emotion	Pearson Correlation	1	**.421****	**.250****	**.408****
	Sig. (2-tailed)	.	.000	.004	.000
	N	128	128	128	128
Humour	Pearson Correlation	.421**	1	.162	**.269****
	Sig. (2-tailed)	.000	.	.067	.002
	N	128	128	128	128
Personal values	Pearson Correlation	.250**	.162	1	**.394****
	Sig. (2-tailed)	.004	.067	.	.000
	N	128	128	128	128
Self-disclosure	Pearson Correlation	.408**	.269**	.394**	1
	Sig. (2-tailed)	.000	.002	.000	.
	N	128	128	128	128

**. Correlation is significant at the 0.01 level (2-tailed).

Table 50 Correlations between affective indicators

		Group reference	Phatics	Salutation/ Closure	Vocatives
Group reference	Pearson Correlation	1	.130	**.234****	**.201***
	Sig. (2-tailed)	.	.143	.008	.023
	N	128	128	128	128
Phatics	Pearson Correlation	.130	1	**.315****	**.289****
	Sig. (2-tailed)	.143	.	.000	.001
	N	128	128	128	128
Salutation/Closure	Pearson Correlation	.234**	.315**	1	**.529****
	Sig. (2-tailed)	.008	.000	.	.000
	N	128	128	128	128
Vocatives	Pearson Correlation	.201*	.289**	.529**	1
	Sig. (2-tailed)	.023	.001	.000	.
	N	128	128	128	128

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 51 Correlations between cohesive indicators

		Acknowledgement	Agreement/Disagreement	Help/Assistance	Inquiry	Invitation
Acknowledgement	Pearson Correlation	1	**.417****	**.188***	.090	-.002
	Sig. (2-tailed)	.	.000	.033	.315	.984
	N	128	128	128	128	128
Agreement/Disagreement	Pearson Correlation	.417**	1	**.345****	-.010	.103
	Sig. (2-tailed)	.000	.	.000	.908	.247
	N	128	128	128	128	128
Help/Assistance	Pearson Correlation	.188*	.345**	1	**.250****	**.254****
	Sig. (2-tailed)	.033	.000	.	.004	.004
	N	128	128	128	128	128
Inquiry	Pearson Correlation	.090	-.010	.250**	1	**.415****
	Sig. (2-tailed)	.315	.908	.004	.	.000
	N	128	128	128	128	128
Invitation	Pearson Correlation	-.002	.103	.254**	.415**	1
	Sig. (2-tailed)	.984	.247	.004	.000	.
	N	128	128	128	128	128

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 52 Correlations between interactive indicators

		Acknowledgement	Agreement/ Disagreement	Help/Assistance	Inquiry	Invitation
Emotion	Pearson Correlation	**.223***	.122	**.255****	.150	.094
	Sig. (2-tailed)	.012	.171	.004	.092	.291
	N	128	128	128	128	128
Humour	Pearson Correlation	.134	**.279****	**.212***	.069	.136
	Sig. (2-tailed)	.132	.001	.017	.441	.127
	N	128	128	128	128	128
Personal values	Pearson Correlation	.151	**.209***	.055	**.397****	**.268****
	Sig. (2-tailed)	.089	.018	.536	.000	.002
	N	128	128	128	128	128
Self-disclosure	Pearson Correlation	.099	.091	.103	**.382****	**.202***
	Sig. (2-tailed)	.265	.307	.246	.000	.022
	N	128	128	128	128	128

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 53 Correlations between affective indicators and interactive indicators

		Emotion	Humour	Personal values	Self-disclosure
Group reference	Pearson Correlation	.008	**.244****	**.216***	.015
	Sig. (2-tailed)	.925	.006	.014	.866
	N	128	128	128	128
Phatics	Pearson Correlation	**.492****	**.333****	.161	.151
	Sig. (2-tailed)	.000	.000	.070	.089
	N	128	128	128	128
Salutation/Closure	Pearson Correlation	**.341****	.094	**.182***	**.188***
	Sig. (2-tailed)	.000	.293	.040	.034
	N	128	128	128	128
Vocatives	Pearson Correlation	**.292****	**.177***	.159	**.205***
	Sig. (2-tailed)	.001	.045	.073	.020
	N	128	128	128	128

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 54 Correlations between cohesive indicators and affective indicators

		Group reference	Phatics	Salutation/ Closure	Vocatives
Acknowledgement	Pearson Correlation	.127	**.243****	**.506****	**.895****
	Sig. (2-tailed)	.152	.006	.000	.000
	N	128	128	128	128
Agreement/ Disagreement	Pearson Correlation	**.421****	**.186***	**.322****	**.483****
	Sig. (2-tailed)	.000	.036	.000	.000
	N	128	128	128	128
Help/Assistance	Pearson Correlation	**.411****	**.258****	**.269****	**.236****
	Sig. (2-tailed)	.000	.003	.002	.007
	N	128	128	128	128
Inquiry	Pearson Correlation	**.177***	-.026	.112	.145
	Sig. (2-tailed)	.045	.774	.207	.103
	N	128	128	128	128
Invitation	Pearson Correlation	.159	.068	.160	.074
	Sig. (2-tailed)	.072	.443	.071	.405
	N	128	128	128	128

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 55 Correlations between interactive indicators and cohesive indicators

APPENDIX O

T-tests: Descriptive statistical results

	Sex	N	Mean	Std. Deviation	Std. Error Mean
Emotion*	Female	81	**33.5296**	32.87662	3.65296
	Male	47	20.5000	25.62518	3.73782
Humour**	Female	81	**12.8444**	18.83758	2.09306
	Male	47	4.4979	11.70497	1.70735
Personal values*	Female	81	39.3840	35.59401	3.95489
	Male	47	**52.2638**	34.96365	5.09997
Self-disclosure*	Female	81	**15.6025**	23.74214	2.63802
	Male	47	9.0872	14.26095	2.08017
Group reference	Female	81	23.3198	27.86261	3.09585
	Male	47	**26.2745**	30.38012	4.43140
Phatics	Female	81	**14.4654**	23.13307	2.57034
	Male	47	12.3085	25.83890	3.76899
Salutation/Closure	Female	81	42.5469	37.39361	4.15485
	Male	47	**52.3851**	38.79319	5.65857
Vocatives	Female	81	**38.4284**	35.03729	3.89303
	Male	47	30.5213	30.83618	4.49792
Acknowledgement	Female	81	**37.3407**	34.00125	3.77792
	Male	47	32.0340	31.63474	4.61440
Agreement/Disagreement	Female	81	17.6395	22.85913	2.53990
	Male	47	17.4851	23.99345	3.49980
Help/Assistance	Female	81	**23.1111**	27.35511	3.03946
	Male	47	17.5936	19.83281	2.89291
Inquiry*	Female	81	**33.4506**	34.51454	3.83495
	Male	47	21.6872	27.65001	4.03317
Invitation	Female	81	**7.5481**	14.16555	1.57395
	Male	47	6.0660	12.35909	1.80276

* p<.05 ** p<.01

Table 56 Social presence between genders

	Sex	N	Mean	Std. Deviation	Std. Error Mean
Number of messages	Female	81	4.69	4.821	.536
	Male	47	5.64	5.773	.842

Table 57 Active participation between genders

	Sex	N	Mean	Std. Deviation	Std. Error Mean
Score	Female	81	61.57	8.128	.932
	Male	47	61.69	9.177	1.368

Table 58 Learning outcomes between genders

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